THE EFFECT OF STOCK SPLIT TOWARD ACTUAL RETURN, TRADING VOLUME ACTIVITY, AND BID-ASK SPREAD
(An Empirical Study on The Companies Listed in Indonesia Stock Exchange Period 2015-2017)

UNDERGRADUATE THESIS

This undergraduate thesis is submitted in partial fulfillment of the requirements to obtain the degree of *Sarjana Ekonomi* in Faculty of Economics Yogyakarta State University

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YOGYAKARTA STATE UNIVERSITY

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This undergraduate thesis had been approved and validated on April 4th, 2018

To be defended in the front of Board of Examiners

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BOARD OF EXAMINERS

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Prof. Sukirno, M.Si.,Ph.D.	Chairman		16/5/2018
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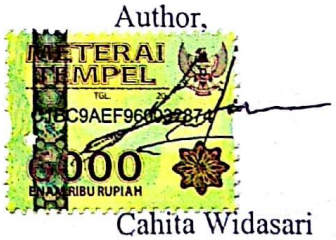
Hereby declared that this undergraduate thesis is my own original work. According to my knowledge, there is no work of opinion written or published by others, except as a reference or citation by following the prevalent procedure of scientific writing.

Yogyakarta, April 4th , 2018

Author,



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MOTTO

And Whoever strives only strives for (the benefit of) himself. Indeed, Allah is free from need of the worlds.

(QS. Al-'Ankabut: 6)

Never give up. Today is hard. Tomorrow will be worse, but the day after tomorrow will be Sunshine.

(Jack Ma)

"Push yourself, because no one else going to do it for you"

(Author)

DEDICATION

To my beloved family who always gives a ton of love,

my friends who always accompany me at any moments,

and for you, who always prayed for me and was beside me till this time,

thank you.

PENGARUH STOCK SPLIT _TERHADAP_ ACTUAL RETURN, TRADING VOLUME ACTIVITY, _DAN_ BID-ASK SPREAD
(Studi Empiris pada Perusahaan yang Terdaftar Di Bursa Efek Indonesia Periode 2015-2017)

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui ada tidaknya perbedaan actual return, trading volume activity, *dan* bid-ask spread *saham pada periode sekitar peristiwa* stock split. *Adanya harga saham yang dinilai terlalu tinggi membuat kemampuan investor untuk membeli saham menjadi berkurang, sehingga perusahaan mengambil tindakan* stock split *dengan tujuan menurunkan harga saham pada kisaran harga yang dapat dicapai invsetor.*

Penelitian ini menggunakan event study *dengan* event window *selama 20 hari, yaitu 10 hari sebelum dan 10 hari sesudah* stock split. *Jenis penelitian ini merupakan penelitian kuantitatif dengan menggunakan data sekunder berupa data harian saham yang didapat dari Bursa Efek Indonesia. Teknik pengambilan sampel yang digunakan adalah* purposive sampling *dan sebanyak 46 perusahaan yang memenuhi kriteria kelengkapan data. Teknik analisis data yang digunakan adalah uji* paired sample t-test *dengan melihat perbedaan rata-rata antara sebelum dan sesudah peristiwa* stock split.

Hasil penelitian ini menunjukkan bahwa tidak terdapat perbedaan return saham pada periode sekitar pengumuman stock split *dengan tingkat signifikansi 0,171. Peneliti juga menemukan tidak adanya perbedaan likuiditas saham yang ditunjukan proksi* Trading Volume Activity (TVA) *dengan tingkat signifikansi 0,636, namun penelitian ini menunjukkan hasil yang berbeda untuk proksi* Bid-Ask Spread *dimana terdapat perbedaan dengan tingkat signifikansi 0,008.*

Kata kunci: stock split, *return saham, likuiditas saham,*actual return, trading volume activity, bid-ask spread

THE EFFECT OF STOCK SPLIT TOWARD ACTUAL RETURN, TRADING VOLUME ACTIVITY, AND BID-ASK SPREAD (An Empirical Study on The Companies Listed in Indonesia Stock Exchange Period 2015-2017)

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ABSTRACT

This study aims to determine whether there are differences in actual return, trading volume activity, and bid-ask spread. The stock price that valued too high made an ability of investor to buy the stock will decrease, so the company got the stock split activity with the aims to decrease the stock price in the certain range that can be achieved by the investor.

This research has used event study with event window for 20 days, that was 10 days before and 10 days after the stock split. This type of research was a quantitative research using secondary data in the form of daily stock data obtained from the Indonesia Stock Exchange. The sampling technique that used in this research was purposive sampling and 46 companies were selected as a sample of this research. The data analysis technique that used in this study was paired sample t-test by looking at the difference between before and after the stock split event.

The results of this study indicate that there is no difference in stock returns in the period around the announcement of the stock split with a significance level of 0.171. The researcher also found no difference in stock liquidity indicated by Trading Volume Activity proxy with a significance level of 0.636, but this research showed the different result for Bid-Ask Spread proxy where there is a difference with significance level 0,008.

Keywords: stock split, stock return, stock liquidity, actual return, trading volume activity, bid-ask spread

FOREWORD

All praise and gratitude go to Allah SWT who always give me the blessings and the chance so that I could finish this undergraduate thesis entitled "The Effect of Stock Split toward Actual Return, Trading Volume Activity, and Bid-Ask Spread (An Empirical Sudies on The Companies Listed in Indonesia Stock Exchange Period 2015-2017)". I also realize that I would not be able to complete this undergraduate thesis without support, guidance, and help from people around me. Therefore, I would like to express my great gratitude to:

1. Prof. Dr. Sutrisna Wibawa, M.Pd., Rector of Yogyakarta State University.
2. Dr. Sugiharsono, M.Si., Dean of Faculty of Economics, Yogyakarta State University.
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Finally, I truly realize that my undergraduate thesis is far from being perfect. The constructive critics and suggestions from the readers are expected.

Yogyakarta, April 4th, 2018

Author,

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CHAPTER I

INTRODUCTION

A. Problem Background

In the Indonesian capital market, there have been many stock split events occurring. Based on data from Kustodian Sentral Efek Indonesia (KSEI), during the year 2017 there has been a stock split event of 21 times. For example, PT Bukit Asam Tbk (PTBA) officially conducted stock splits on Thursday, December 14, 2017 ago. After the stock split, Bukit Asam's par value changed from Rp 11,200 to Rp 2,240 per share. At the opening of trading on PTBA day to do the stock split, PTBA shares directly up 30 points or equivalent 1.34 percent at Rp 2,270 level. Another again with BRI who did the split its shares on November 10, 2017 ago. In BBRI stocks, the price is on a downward trend. BBRI price fell 2.76% to Rp 3,170 level on 4 days after the stock split. This happens because BBRI stock has been hunted before stock split, and BBRI prices have continued to rise before the stock split. The number of stock split events proves that a stock split is an event that has an influence in the world of capital markets.

The capital market also provides an investment means for investors to invest their money in the hope of obtaining a return. In addition to get the return, investors pay attention to several things, such as stock liquidity, and the other actions that will be their judgment to make decisions. Stock liquidity is an important criteria that watch by investors before conducting an

analysis (technical or fundamental) to the stock. There are some of method to calculate the stock liqudity, such as Trading Volume Activity, Bid-Ask Spread, the number of shareholders, and stock volatity. The advantage of investors that choose the high stock liquidity is it will more easily transacted, more likely to earn the capital gains, and avoid delisting threats.

According to Setyawan (2015), the capital market is closely related to corporate action by a public company. A corporate action is a decision made by a company that has sold its ownership to the public and will affect stakeholders including shareholders. This action is carried out by the company for various purposes, such as sharing the company's profits to shareholders, change the price of outstanding stocks, or restructure the company to generate greater profits. Actions that include in corporate action are stock split, dividends, mergers, acquisitions, and spin-offs.

One of the corporate action is a stock split announcement. A stock split is an activity undertaken by a go public company to increase the number of outstanding stock, this activity is usually done at the time when stock prices are overvalued, so it can reduce the ability of investors to buy the stock (Brigham and Ehrhardt, 2011: 587)

Stock split announcements are considered as meaningful information by investors to make investment decisions. A stock split makes the stock price will be lower, so it will be easier to reached by the small investor. It is can make the stock demand will be increasing and the stock will become

more liquid (Mila, 2010). Since the stock split increases the number of outstanding stock without adding to the overall value of the stock, then the stock price after the stock split will also fall in accordance with its split factor.

The reason of the company doing a stock split is to make the stock price not too high. A low stock price will increase the liquidity of trading. If the stock price becomes cheaper than before, there is a possibility that will cause the stock transaction increase, so that stock prices often change and may provide an opportunity to obtain an abnormal return. (Fama, Fisher, and Jensen, 1969).

According to Marwata (2001), stock splits means breaking a sheet of stock into n sheet of stock. Stock splits cause an increase in the number of outstanding stock without a sale and purchase transaction that changes the capital. The price per share after the stock split is just a stock cosmetics, in the sense that it is a stock polishing effort to make it look more attractive to investors even if it does not increase prosperity for investors. Stock split action will create a mirage effect for investors, that is investors will feel as if to be more prosperous because it holds more stock. Thus, the stock split is an action that has no economic value. However, many stock events are an important tool in capital market practice.

There are two hypotheses that propose the company's motivation in a stock split, namely Signaling Hypothesis and market range hypothesis (Fama, 1970). In Signaling Hypothesis, the manager announces a stock split to convey positive information about the company. When the company announces a stock split, the company believes that in the future the value of the company will continue to increase due to the manager's expertise in making an investment and operating decisions (Ikenberry, Rankie, 1996). According to the Market Range Hypothesis, the company did a stock split because the stock prices are very high and it makes the stock become not liquid again so the stock trading volume will be low and less attractive to investors.

Studies related with the stock split have been widely conducted, but there are different results on the effect of the stock split, for example, a research from Huang, Liano & Pan (2013) concluded that stock liquidity increased significantly in the announcement period when compared with the previous period. In another study of Desai, Nirmalendran, & Venkataraman (1998) that examined the relationship between trading volume activity and bid-ask spreads from stock split companies, this study shows the opposite result of the market range hypothesis, where the researcher found that after stock split, the average bid-ask spread increased by 32%, in fact the higher bid-ask spreads then the stock would become less liquid because investors had to lose the price according to the highest bid price in order to be able to sell their shares directly. There is also research from Bachtiar (2013) on the

influence of Stock Split to Liquidity and Stock Return on Go Public Company in Indonesia Stock Exchange, whose hypothesis test results conclude that there is no difference in liquidity before and after stock split and there is no difference also on stock return before and after the stock split.

In Indonesia there was a lot of stock split events that occurred and there are diverse the results of research on its effects in the capital market. Based on the background of the problem, the author is interested to conduct further research entitled "The Effect of Stock Split Toward Actual Return, Trading Volume Activity, and Bid-Ask Spread (An Empirical Study on The Companies Listed in Indonesia Stock Exchange Period 2015-2017)".

B. Problem Identification

Based on the problem background, the problem identification for this research are as follows:

1. A stock split is one of the corporate actions to be considered by investors in making stock investments, so it needs to be investigated further whether stock split has an influence on the stock movement that occur.
2. Getting a return is one of the goals of investors in making stock investments, so it needs to do research on the factors that can affect stock returns.
3. In investing, investors tend to choose a liquid stock, so investors need to know what factors that can affect stock liquidity.

4. There is inconsistency in previous research results regarding the effect of stock split toward stock return and liquidity.

C. Problem Restriction

Based on the problem background and the problem identification above, this study focuses on the effect of stock split toward stock return and stock liquidity. In this research, the stock return is proxied by the actual return, and the stock liquidity is proxied by Trading Volume Activity and Bid-Ask Spread. This research will be conducted on companies listed in the Indonesia Stock Exchange for the period of 2015-2017.

D. Problem Formulation

Based on the problem restriction above, the problem formulations in this study are as follows:

1. Is there any difference of Actual Return around the stock split activity?
2. Is there any difference of Trading Volume Activity around the stock split activity?
3. Is there any difference of Bid-Ask Spread around the stock split activity?

E. Research Objectives

Based on the problem formulation above, the purposes of this study are as follows:

1. Knowing the difference of Actual Return around the stock split activity

2. Knowing the difference of Trading Volume Activity around the stock split activity.
3. Knowing the difference of Bid-Ask Spread around the stock split activity

F. Research Benefits

The results of this study are expected to give benefits in terms of theoretical and practical.

1. Theoretical Benefit

   The results of this study are expected to give to the development of accounting science, especially information about stock split. This is also expected to be a source of references and information for the parties who will conduct research in the same field.

2. Practical Benefit

   a. For Corporate / Management

      This research is expected to be a source of corporate information about the effect of stock split toward actual return, trading volume activity, and bid-ask spread, it can be a consideration for companies in making decisions related to stock split.

   b. For Investors

      This research is expected to provide additional information and can be used as a reference by investors in considering the effect of stock split toward actual return, trading volume activity, and bid-ask spread on shares that will or have owned.

CHAPTER II

LITERATURE REVIEW

A. Theoretical Review

1. Stock Split

A stock split is a stock that split into n shares at a new share price of 1 / n of the previous stock price, performed by the company's managers to re-arrange the stock market price by increasing the number of outstanding stock (Jogiyanto, 2014: 629-630). According to Brigham and Ehrhardt (2011: 587) stock split is an activity undertaken by companies that had go public to raise the number of outstanding stock.

There are a lot of stock split events occurring in Indonesia. It is indicates that a stock split is a corporate action that influences the capital market practice. The stock split is one tool that can be used to manage stock prices in lower ranges so that more investors can afford to transact and can increase stock liquidity.

Some of the reasons that underlying the company do stock split are:

a. To make the stock is more attractive for investors because psychologically investors are more interested in stocks that are cheaper. A cheaper price will attract investors to buy it, so the stock price will increase, although there is no guarantee for it.

b. The number of outstanding stock will be more, so it is relatively marketable and liquid.

Jogiyanto (2004: 22) said there are two types of stock split that can be done: stock split-up and stock split-down.

a. Stock split-up is a decrease in the nominal value per share that make the number of outstanding stock is increasing. For example stock split with 1: 2, 1: 3, and 1: 4 splitting factor. Stock split with 1: 2 splitting factor means there are two new stocks (a spread after stock split) that can be exchanged with 1 piece of old stock (sheet before stock split) and so on.
b. Stock split-down or reverse split is the increase in the nominal value per share and reduce the number of outstanding stock. For example, break down with 2: 1, 3: 1, 4: 1 splitting factor. A stock split with 2: 1 splitting factor means one new stock (a spread after stock split) can be exchanged for two old stocks (the sheet before stock split) and so on.

In this research, the researcher chooses stock split-up as a variable because stock split is one of corporate action that often occur in the Indonesia capital market. It is indicates that a stock split can influences the capital market practice.

Theoretically, the motivation behind the company to do stock split and the effects posed by several theories. There are three theories

that dominate stock split literature, namely efficient market theory, signaling theory, and trading range theory.

a. Efficient Market Theory

This research wants to test how the market reacts to stock split events. According to Rahayu (2018), the reaction shown by the market can be either positive or negative. Positive if an information can increase stock prices in the stock market and is negative if applicable otherwise. If the market can react quickly and appropriately to achieve a new equilibrium price that fully reflects the available information, then such conditions are called efficient markets (Jogiyanto, 2000: 351).

The key to measuring efficient markets is the relationship between the price of securities and information. The efficient market test forms are devided by 3, there are efficient market weak form, efficien market semi strong form, and efficient market strong form (Jogiyanto, 2000: 352).

1) Efficient Market Weak Form

Efficient markets in weak form mean the market prices of securities fully reflect past information. Therefore, such historical information (such as price and trading volume, and other events in the future) can no longer be used to predict future price changes, as already reflected in current prices. This means that for markets thatare of weaker form efficiency,

investors cannot use past information to gain an abnormal profit.

2) Efficient Market Semi Strong Form

An efficient market in the semi strong form means a market price of securities fully reflect all published information (such as earnings, dividend, stock split announcements, new stock issues, financial difficulties at the company, and other public events affecting company cash flow in the future). In an efficient market of semi strong form, abnormal return occurs only around the announcement (publication) of an event as a representative of the market response to the announcement. A market is declared efficient in a semi strong form when the information is quickly absorbed or responded by the market (within one to two spot time or day around the announcement).

According to Sunarjanto and Adisastra (2008), Indonesia Capital Market was an effcient market in the semi strong form. It is indicates with the information in deviden announcement event and the market that have a fast reaction to the information, so the stock price fully reflected to all information that published.

3) Efficient Market Strong Form

An efficient market in strong form means the market prices of securities fully reflect all information including private information (unpublished information). In a strong efficient market, there will be no investor who can obtain an abnormal return because it has private information.

Based on the explanation above, the efficient market theory that used in this study is efficient market semi strong form. It is to see how fast the information that published reflecting the stock price.

b. Signalling Theory

The principle of Signaling Theory is that every action contains information because of the asymmetric information. It is a condition in which a party has more information than the other party. Signaling Theory will encourage companies to do stock splits because of investment opportunities and best corporate prospects in the future.

According to Jogiyanto (2010: 561-562), stock split requires a cost to be borne so that only companies that have good prospects that are able to implement stock split. Conversely, companies that do not have a good prospect that tries to provide invalid signals through a stock split will not be able to bear the cost. The company did stock split has increased the profit after the

stock split events, this research supports the hypothesis of Signaling Theory (Copeland, 1979).

c. Trading Range Theory

According to The Trading Range Theory described, stock splits are used as a tool to rearrange stock prices at the desired price range so that it is possible for investors to buy stocks in large quantities. The Trading Range Theory described by Fama (1970), states that investors would prefer stocks in a certain range. If a stock is trading at a very high per-share price, a small-scale investor can not afford to buy the stock so that it becomes less liquid and rarely traded, whereas if the stock price is too low, the transaction cost becomes very high when compared to the stock price. The company will do a stock split if the stock price is considered too expensive and reverse split if it is too cheap. Copeland (1979) revealed that by doing a stock split, then the optimal stock price range (optimal range) can be achieved. Achieving an optimal stock price will create a wider market.

2. Stock Return

According to Jogiyanto (2014: 263), a return is the result of investment. The total return is the overall return on an investment in the certain period. The total return is often referred to as a return. The

total return consists of capital gains and dividends. A return can be divided into two:

a. A Realized Return

A Realized return or an actual return is a return that has occurred. A Realized return is calculated using historical data. A realized return can measure with some kind of measurements, such as total returns, relative returns, cumulative returns, and adjusted returns. The average of returns can be calculated based on arithmetic and geometric mean. A realized return measurement is used to measure the performance of a company, as a basis for determining an expected return and the future risk.

b. An Expected Return

An expected return is a return that investor expected in the future. An expected return can be calculated based on several ways as follows:

1) Based on future expectation value
2) Based on the values of historical return
3) Based on the existing expectation return model.

The calculation of stock returns by Jogiyanto (2014: 268) is as follows:

$$\text{Return} = \frac{P_t - P_{t-1}}{P_{t-1}} + \frac{D_t}{P_{t-1}}$$

$$= \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

Information:

P_t = the stock price in this year

P_{t-1} = the stock price in the previous year

D_t = the dividend in this year

The return can be negative or positive. Sometimes, for a certain calculation, a positive return is required. For that relative return can be used by adding 1 to the total return value, so the formula is:

A return relative = A Total return + 1

$$= \frac{\mathbf{P_t - P_{t-1} + D_t}}{\mathbf{P_{t-1}}} + \frac{\mathbf{P_{t-1}}}{\mathbf{P_{t-1}}}$$

$$= \frac{\mathbf{P_t + D_t}}{\mathbf{P_{t-1}}}$$

And this study, the researcher use a realized return or an actual return as a proxy for the stock return.

3. Stock Liquidity

According to Baker dan Powell (1993), a stock liquidity is a measure of the number of transactions of a particular stock as measured by the trading volume activity of shares in the capital market in a certain period. Stock liquidity will increase if the number of shares traded is greater than the number of outstanding stock as

proportional. The more liquid a share, the more interested investors to buy it.

Stock liquidity deals with the ability of a stock to be quickly converted into money or back into stock at little cost with little impact on stock prices. In the real capital market, a liquid stock is a stock that requires only minimal fees to convert from stocks into money or the opposite. Investors have different attitudes related to stock liquidity. There are investors who consider relatively important and there are investors who consider unimportant. Investors who prefer liquid stocks will choose to buy liquid stocks in the short term with relatively quick and low returns. As for investors who do not pay attention to stock liquidity tend to choose stocks for long-term with hope of higher returns in the future. (Alteza et al, 2014)

Commonly used parameters to measure the liquidity of a stock (Conroy et al., 1990) are:

a. Trading Volume

   It is an instrument that can be used to see the reaction of the capital market to information through the volume of stock parameters traded in the market.

b. Bid-Ask-Spread

   It is an instrument that can be used to see the capital market reaction through the difference between the highest price asked to

buy with the lowest bid to sale (Bid-Ask Spread). It is measured using precentage. Information Flow

c. The number of shareholders
d. The number of shares outstanding
e. Transaction cost

The information flow factor, the number of shareholders, the number of shares outstanding, the transaction cost will affect the trading volume so it can know the effect on liquidity

f. Stock price

It is an instrument that can be used to see the reaction of the capital markets in the market.

g. The volatility of stock prices

It is an instrument that can be used to see the reaction of the capital market to information through the parameters of movement of stock prices in the market.

Meanwhile, according to Wang Sutrisno (2000) , the parameters used are:

a. Stock price
b. Trading volume
c. Percent shared
d. Stock variance (stock volatility)

In this study used the trading volume and bid-ask price as a proxy of stock liquidity.

a. Bid-Ask Spread

Bid-Ask Spread is the percentage difference between bid price or bid price and ask price. Hamilton (1991) in Fatmawati and Asri (1999) has two spread models, namely dealer spread and market spread. Dealer spread is the difference between the bid price and the ask price that causes the individual dealer to trade securities with his own activities. While the market spread is the difference between the highest bid with lower ask that occurs at a certain time. This type of spread is happening on the Indonesia Stock Exchange.

After the stock split is done by the company, it produces a lower stock price. The low price makes the stock transactions easier to implement. This is because the bid price and the ask price will be smaller which means that the liquidity of shares increases.

b. Trading Volume Activity

Trading volume is the sum of the stocks traded on the market within a certain period. Changes in trading volume illustrate how stock trading activity and reflect investor decisions. When trading volume is high, it can be concluded that the stock is in demand by the investors (Pamikitsih, 2017). Trading volume

has a correlation contrary to bid-ask spread. When Bid-Ask Spread decreases, the Trading Volume Activity (TVA) will increase. This is because when the difference between the price of supply and demand will be smaller, than the number of shares will be increased.

If TVA gets bigger, so the stock will get more liquid, otherwise, if TVA gets smaller, so the stock is getting not liquid. Copeland (1979) describes liquidity is measured by the amount of Trading Volume Activity (TVA) as formulated as follows:

$$TVA = \frac{the\ amount\ of\ companies\ that\ traded\ in\ day{-}t}{Total\ stocks}$$

4. Event Study

An event study is a study that is studying the market reaction to an event whose information is published as an announcement (Jogiyanto, 2014: 623). The purpose of event study is to know the comparison of values before and after the event occurs, assessing whether there are differences in circumstances before and after the event occurred. The event tested in this research is a stock split. Information from stock split events will be tested for the effect on stock returns and liquidity. The steps in conducting the event study are as follows (Astuti, 2012):

a. Identify the publication date of stock split.

The publication date of the stock split is the listing date on the Indonesia Stock Exchange when the shares were traded, this is done to facilitate the determination of day 0 as the day of the occurrence of stock split.

b. Determine the study period in an event window.

The longer the study period used, the more things can be seen, but the conclusion results can be biased because it is affected by other events such as corporate action conducted by the company. This research uses 20 days event window, which is 10 days before stock split, and 10 days after the stock split. The researcher use 20 days for the event window because most research about stock split use 20 days of their event window, like the research from Setyawan (2015) and Permadi (2011).

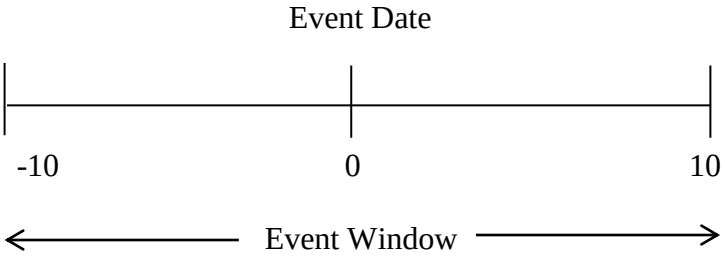

Figure 1 : Event Window

c. Determine the specific criteria needed for the event study.

d. Make measurements necessary to be able to assess the significant differences of the event.

B. Relevant Researches

Research on capital market, especially related to stock split has been done. The researches that have been conducted and relevant to this research are as follows:

1. The Effect of Stock Split towards Stock Return and Liquidity at Indonesia Stock Exchange by Andi Setyawan (2015)

   The research conducted by Andi Setyawan aims to examine the effect of stock split toward stock return and liquidity. The sample that used in this study is all companies listed in Indonesia Stock Exchange and doing a stock split in the period 2009-2014. The results of this study conclude that there is a positive abnormal return on four days before the stock split and on the day of stock split. The Researcher also found that there is an increase in stock liquidity in the period after stock split by using the frequency of stock trading proxy.

   The similarity between research conducted by Andi Setyawan with this research is having same two variables, that is return and stock liquidity. In addition, these two studies use the same window event, which is 20 days. While the differences between these two studies are in the research period.

2. The Effect of Stock Split towards Stock Trading Volume and Abnormal Return on Companies Listed in IDX 2007-2009 by I Gusti Ayu Mila W (2010)

I Gusti Ayu Mila W (2010) examines that there is no significant influence on average trading volume before and after the stock split. In addition, this study shows that there is no significant effect on the average abnormal return before and after the stock split. It means that the stock trading volume and abnormal return didn't have a reaction from the market.

The similarity between research conducted by I Gusti Ayu Mila with this research are both has the same variable. In addition, this study also has an event window similar to previous research, It is 20 days, 10 days before stock split, and 10 days after the stock split. While the differences between these two studies are in the research period.

3. The Effect of Stock Split towards Stock Liquidity and Stock Return Analysis by Iguh Wijanarko

Iguh Wijanarko examines the effect of stock split toward liquidity and stock returns on 31 companies doing stock splits on the IDX period 2007-2011. Since the test result of one sample t-test showed that the market reacted quickly from the abnormal return with a significance level 0.003 on the first day after the stock split and the significance level 0.001 for trading volume activity. While based on different test results showed no difference in the abnormal return before and after the stock split with a significant level 0.582, but showed a difference in the trading volume activity where a significant level of 0.027.

The similarities between the research conducted by Wijanarko with this research are using stock return and stock liquidity as the variable. While the differences between the two studies are present in the event window that used, the research conducted by Wijanarko used the event window for 10 days, while in this study used the event window for 20 days.

4. The Influence of Stock Split towards Stock Liquidity and Company Future profitability by Fatima Nur Izza (2016)

The research conducted by Fatima Nur Izza aims to analyze the effect of a stock split announcement on stock liquidity and future profitability around the stock split announcement. Stock liquidity is proxied by Trading Volume Activity (TVA) and stock prices, while Earning per Share (ΔEAT) as a proxy in measuring Future Profitability. The result of this research is (1) the announcement of stock split has an effect on TVA, this is proved by result of paired sample t-test with significance level 0,019 (0,019<0,05). (2) The announcement of stock split has an effect on stock price, this is proved by the result of paired sample t-test with significance level 0,044 (0,044<0,05). (3) The stock split announcement has no effect on profit growth (ΔEAT), it is proved by simple linear regression test with significance level 0,085 (0,085> 0,05).

The similiarities between the research conducted by Fatima Nur Izza with this research are on the variable, that is stock liquidity. The

difference between both of the researches is Fatima's research using event window for 14 days, while this research use event window for 20 days.

5. The Effect of Stock Split towards Stock Return, Future Profitability, and Stock Trading Liquidity by Permadi (2011)

   The purpose of the research conducted by Permadi is to review whether in the period of 2004-2010 the stock split event brought a valuable information content, thus impacting its stock return, and to prove whether stock split can be used as a signal for investors to assess future profitability, and test whether there are differences in stock trading liquidity between before and after the stock split. The result of this research shows that stock split effected on stock return, seen from abnormal return around stock split event. Another analysis result concludes that stock split cannot be used as a signal about company performance will be better in the future, and there is difference of trading liquidity between before and after the stock split.

   The similarity between research conducted by Permadi with this research is using the same variable that is stock return and stock liquidity. The differences in these two studies are Permadi's research using the research period 2005-2011, while in this study using the research period 2015-2017.

C. Conceptual Framework

Based on the theories above, the conceptual framework in this research are as follows:

1. The Effect of Stock Split toward Actual Return

A return is the result that obtained from the investment. The total return means the overall return of an investment in a given period, consisting of capital gains and dividends. This study sees that a stock split is a corporate action that has a tendency to have a positive abnormal return on a few days before, after, and when stock splits occur.

Signalling theory suggests that stock splits provide an informative signal to investors about the prospects for future performance improvement and profitability. When investors respond to a stock split policy with a positive response there will be an increase in demand for a company's stock that can lead to an increase in stock prices. Increasing the stock price will affect the return that earned by investors.

2. The Effect of Stock Split toward Trading Volume Activity

Trading Volume Activity will increase if the number of shares traded is greater than the amount of outstanding stock in proportion. This research shows that when a company does stock split it will cause an increase in Trading Volume Activity in the period after the stock split. Stock split action makes stock issuers in the market will be

cheaper and the number of shares will be more. The cheaper and more outstanding stock, the opportunity for the public to have the stock will be bigger, Trading Volume Activity will be rise, and the liquidity of the stock will increase.

3. The Effect of Stock Split toward Bid-Ask Spread

In calculating the stock liquidity, Bid-Ask Spread has a correlation contrary to Trading Volume Activity. When Bid-Ask Spread decreases, the Trading Volume Activity (TVA) will increase. This research shows that when a company does stock split it will cause a decrease in Bid-Ask Spread around the stock split activity. After the stock split is done by the company, it produces a lower stock price. The low price makes the stock transactions easier to implement. This is because the bid price and the ask price will be smaller which means that the liquidity of shares increases.

D. Research Paradigm

Based on the conceptual framework above, the research paradigm in this study are as follows:

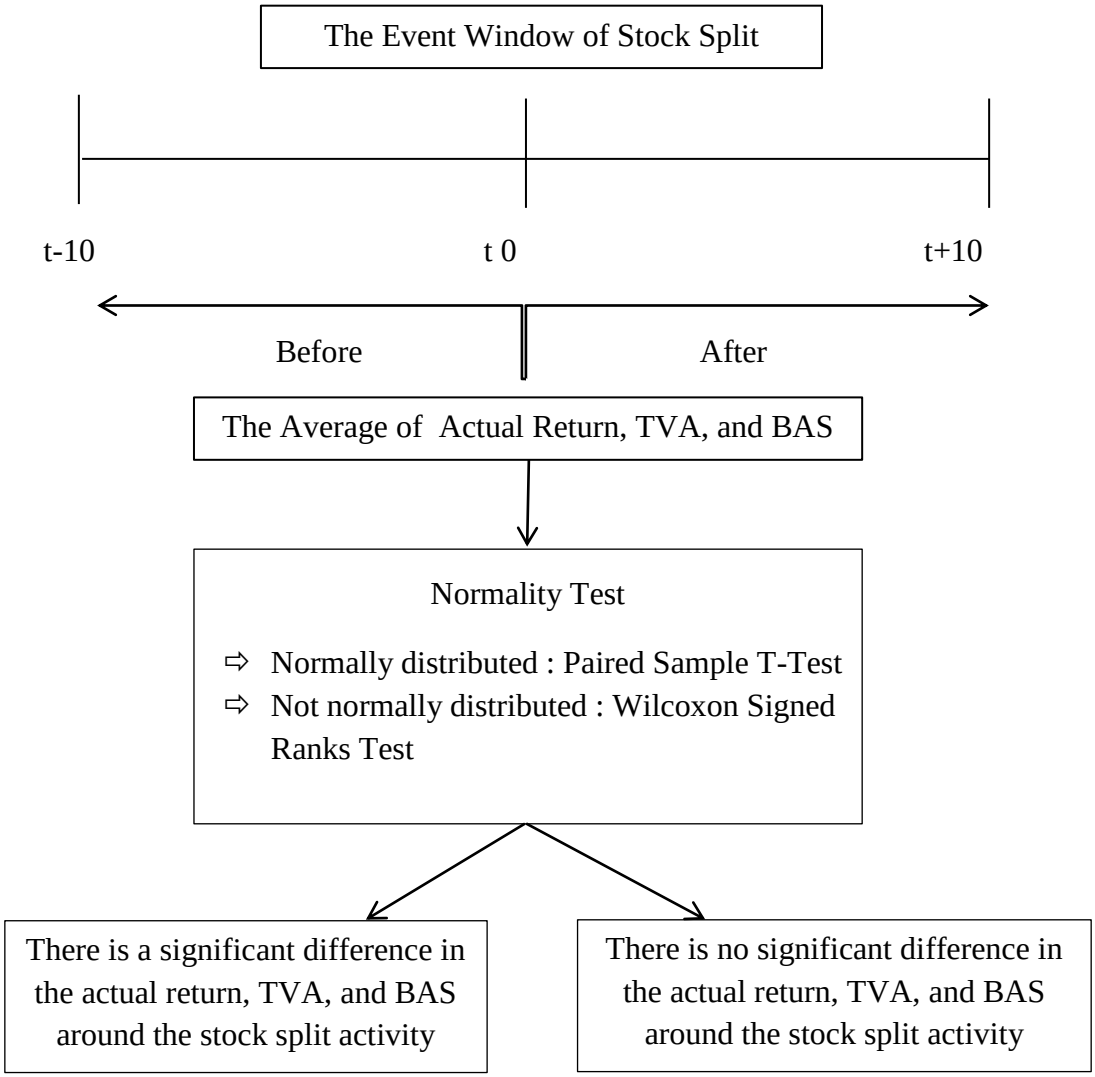

Figure 2. Research Paradigm

E. Research Hypothesis

Based on the problem formulation that has been discussed, the hypothesis in this study are as follows:

H1 : There is a significant difference in the actual return around the stock split activity

H2 : There is a significant difference in Trading Volume Activity (TVA) around the stock split activity

H3 : There is a significant difference in Bid-Ask Spread (BAS) around the stock split activity

CHAPTER III

RESEARCH METHOD

A. Types of Research

Type of research that used in this research is event study. An event study is a study that studies the market reaction to an event whose information is published as an announcement. The purpose of using the method of event study is to know the comparison of values that occur before and after the event. The event that tested in this research is stock split. This study used the windows period for 20 days, it is 10 days before and 10 days after the stock split. Information from the stock split events will be tested for the effect on actual return, Trading Volume Activity, and Bid-Ask Spread.

B. Place and Time Research

This research was conducted on companies listed on the Indonesia Stock Exchange, which do a stock split in 2015-2017. This study uses data obtained from the website of PT. Indonesia Stock Exchange (www.idx.co.id), PT Kustodian Sentral Efek Indonesia (www.ksei.co.id), Yahoo Finance (www.finance.yahoo.com), and the other relevant sources. Data collection is done in January 2018 to collect data of company name, stock split, split factor, and other corporate action that happened to companies listed on the Indonesia Stock Exchange between 2015-2017.

Furthermore, in February-March 2018 to analyze data and prepare research reports.

C. Population and Sample Research

A population is a generalization region consisting of objects or subjects that have certain qualities and characteristics set by the researchers to be studied and then drawn conclusions (Sugiyono, 2013: 191). Kuncoro (2013: 118) explains that a population is a complete group of elements in which we are interested to study it or become the object of research. The population refers to the whole, the group of people, events, or interests that investigators want (Sekaran, 2006b: 121). The population in this research is all companies that do stock split and listed in Indonesia Stock Exchange between the year 2015-2017.

The sample is part of the number and characteristics possessed by the population (Sugiyono, 2013: 120). The sample is a subset of the population unit (Kuncoro, 2013: 118). Sekaran (2006b: 123) explains the sample is part of a population consist of selected members of the population. The sampling technique used in this study is purposive sampling or sample selection, the selection of this technique intends for the researcher to select the research samples in accordance with the purpose of the study.

The purposive sampling criteria that used by the researcher are as follows:

1. Types of stocks are common stocks of all sub-sectors in IHSG.
2. Companies that conduct corporate action in the form of stock split-up in the study period.
3. Companies that do not conduct other corporate actions during the study period (10 days before, after, and when the stock split) in order to avoid confounding effect. Confounding effect is the effect of bias that arises due to the occurrence of important events that also occur at the same time.
4. Have complete data.

There are 58 companies that do a stock split during the study period. Then for the companies that do a stock split and pass the purposive sampling are 46 companies. List of companies that do a stock split during 2015 to 2017 is in Appendix 1.

D. Operational Definition

In this study, the variables that used are as follows:

1. Stock Returns

In this study, researchers used an actual return as a proxy of stock returns, an actual return calculated by the steps as follows:

1) Calculate The Actual Return

Stock return during the observation period 21 days (10 days before, 10 days after, and 1 day when stock split) is calculated using the total return with the formula:

$$\mathrm{Ri,t} = \frac{\mathrm{Pt} - \mathrm{P_{t-1}}}{\mathrm{P_{t-1}}}$$

2) Calculate The Average Actual Return

$$\text{The Average Actual Return} = \frac{\sum_{i=t}^{k} \mathrm{Ri,t}}{k}$$

Information:

Ri,t : actual return of stock (i) on day t

Pt : stock price (i) on day t

P_{t-1}: stock price (i) before day t

k : number of stocks affected by the selected event

2. Trading Volume Activity

The liquidity in this research uses Trading Volume Activity (TVA) as a proxy. The steps to calculate TVA are as follows:

1) Calculate The Trading Volume Activity (TVA)

$$\mathrm{TVA} = \frac{\Sigma \text{stock (i)traded on day t}}{\Sigma \text{stock (i)listed on day t}}$$

2) Calculate The Average Trading Volume Activity (ATVA)

$$\mathrm{ATVA} = \frac{\sum_{i=t}^{k} \mathrm{TVAi,t}}{k}$$

Information:

ATVA : average of TVA on day t

TVAi,t : TVA stocks (i) on day t

k : number of stocks affected by the selected event

3. Bid-Ask Spread

The amount of Bid-Ask Spread as a liquidity proxy indicates that the higher the spread the liquidity of the stock will be smaller (Susanti, 2005). To measure the amount of spread used the formula as follows:

1) Calculate The Bid-Ask Spread (BAS)

$$\mathrm{BAS_{j,t}} = \frac{\mathrm{AP_{j,t}} - \mathrm{BP_{j,t}}}{\left(\frac{1}{2}\right)(\mathrm{AP_{j,t}} + \mathrm{BP_{j,t}})}$$

2) Calculate The Average Trading Volume Activity (ATVA)

$$\text{The average of BAS} = \frac{\sum_{\mathrm{i=t}}^{\mathrm{k}} \mathrm{BAS_{j,t}}}{\mathrm{k}}$$

Information:

$BAS_{j,t}$: Bid-ask spread on day t

$AP_{j,t}$: Ask price on day t

$BP_{j,t}$: Bid price on day t

k : number of stocks affected by the selected event

4. Stock Split

In this study, the variables used as independent variables is stock split. The stock split can be divided into two types, namely, stock splits up and split down / reverse split.

The stock split up is an increase the number of outstanding stock by splitting a sheet of stock into n shares, while reverse split is an

increase in nominal value per share by reducing the number of outstanding stock. This study prefers to split up, which is to increase the number of shares outstanding. The number of outstanding stock is expected can decrease the stock price so it can attract investors to buy it and the stock will become more liquid.

E. Data Collection Technique

In this study, the researcher used secondary data obtained from the website of PT. Indonesia Stock Exchange, PT Kustodian Sentral Efek Indonesia (KSEI) and Yahoo Finance. From KSEI, the researcher obtained the data of a list of companies that conduct stock split from 2015-2017. From Yahoo Finance and Indonesia Stock Exchange, the researcher obtained data in the form of the daily closing price of each stock, the liste d shares, volume, bid, and offer price.

Based on the type of data performed, data collection methods that used in this study is documentation by collecting secondary data. The data has been published and documented on the official website of KSEI, Yahoo Finance, and Indonesia Stock Exchange.

F. Data Analysis Techniques

1. Descriptive Statistical Analysis

According to Sugiyono (2014: 21) descriptive analysis method is the statistic used to analyze the data by describing the data that has been collected without intending to make general conclusions. This analysis is

only an accumulation of basic data in the form of description in the sense of not seeking or explaining mutual relationships, testing hypotheses, making predictions, or making conclusions. Descriptive statistics present important numerical measures for sample data. Descriptive statistics are also used to find out the mean, minimum, maximum and standard deviation of the variables that studied.

2. Normality Test

The data normality test is one part of the prerequisite test analysis in the study (Sekaran, 2006). This study conducted a normality test using Kolmogorov-Smirnov by using a data processing application. This test is conducted to determine whether the research data is normally distributed or not. This can be known by looking at the significance of the data. If the asymmetric significance (two-tailed) is greater than the degree of confidence, which in this study 5%, then the data distribution is normal. If the asymmetric significance (two-tailed) is less than 5%, the data distribution is not normal.

3. Hypothesis Test

This research uses statistical analysis of different parametric test. The different test is conducted to prove whether there is a significant impact of stock split toward stock return and stock liquidity on the window periods. The different test is conducted in two ways, namely:

a. Paired Sample t-Test

The Paired Sample t-Test is used if the data is normally distributed. This test is used to compare two population rates for different periods.

$$t = \frac{\overline{x1} - \overline{x2}}{\sqrt{\frac{s1^2}{n1} + \frac{s2^2}{n2} - 2r\left(\frac{s1}{\sqrt{n1}}\right)\left(\frac{s2}{\sqrt{n2}}\right)}}$$

Information:

$\overline{x1}$: the samples average before stock split

$\overline{x2}$: the samples average after stock split

s1 : simpangan baku before stock split

s2 : simpangan baku after stock split

n1 : the number of samples before stock split

n2 : the number of samples after stock split

The basis for decision making are as follows:

1) If $t_{arithmetic} > t_{tabel}$ or The Asym sig.2-tailed value $\leq \alpha$ then H_0 is rejected and Ha is accepted
2) If $t_{arithmetic} \leq t_{tabel}$ or The Asym sig.2-tailed value $\geq \alpha$ then H_0 is accepted and Ha is rejected.

Hypothesis statistical tests can be formulated as follows:

1) H_{01}: $\mu 1 = \mu 2$, means that there is no difference in the stock return around the date of stock split events

H_{a1} :μ1≠μ2, means that there is a difference in the stock return around the date of stock split events

2) H_{02} : μ1= μ2, means that there is no difference in Trading Volume Activity around the date of stock split events

   H_{a2} :μ1≠μ2, means that there is a difference in Trading Volume Activity around the date of stock split events

3) H_{03} : μ1= μ2, means that there is no difference in Bid-Ask Spread around the date of stock split events

   H_{a3} :μ1≠μ2, means that there is a difference in Bid-Ask Spread around the date of stock split events

b. Wilcoxon Signed Ranks Test

Wilcoxon Signed Ranks Test is used if the data is not normally distributed.

$$Z = \frac{T - \left[\frac{1}{4N(N+1)}\right]}{\sqrt{\frac{1}{24N(N+1)(2N+1)}}}$$

Information:

N : The number of data that was change after the stock split activity

T : The number of rank from the negative gap value (if the number of positive gap > the negative gap)

The number of rank from the positive gap value (if the number of negative gap > the positive gap)

The basis for decision making are as follows:

1) If $Z_{arithmetic} > Z_{tabel}$ or The Asym sig.2-tailed value $\leq \alpha$ then H_0 is rejected and Ha is accepted
2) If $Z_{arithmetic} \leq Z_{tabel}$ or The Asym sig.2-tailed value $\geq \alpha$ then H_0 is accepted and Ha is rejected.

Hypothesis statistical tests can be formulated as follows:

1) H_{01}: $\mu 1 = \mu 2$, means that there is no difference in the stock return around the date of stock split events

   H_{a1} :$\mu 1 \neq \mu 2$, means that there is a difference in the stock return around the date of stock split events
2) H_{02} : $\mu 1 = \mu 2$, means that there is no difference in Trading Volume Activity around the date of stock split events

   H_{a2} :$\mu 1 \neq \mu 2$, means that there is a difference in Trading Volume Activity around the date of stock split events
3) H_{03} : $\mu 1 = \mu 2$, means that there is no difference in Bid-Ask Spread around the date of stock split events

   H_{a3} :$\mu 1 \neq \mu 2$, means that there is a difference in Bid-Ask Spread around the date of stock split events.

CHAPTER IV

RESULT AND DISCUSSION

A. Description of Research Data

Objects studied in this study are companies listed in the Indonesia Stock Exchange which announces stock split from 2015-2017. The overall data in this study is secondary data obtained from the official website of Indonesia Stock Exchange (www.idx.co.id), official website of PT. Kustodian Sentral Efek Indonesia (www.ksei.co.id), and Yahoo Finance (www.finance.yahoo.com). The population in this study is a company listed on the Indonesia Stock Exchange period 2015-2017 which announces stock split. The number of companies declaring the stock split is 58 companies, but 12 companies are not included in the sample criteria because in the window observation period also make other corporate action announcements, did not have complete data, and some are not actively traded, so the remaining sample is only 46 companies .

According to Sugiyono (2014: 21) descriptive analysis method is a statistic used to analyze data by way of describing and describing the data that has been collected as it is without intending to make general conclusions or generalizations. Descriptive statistics are also used to determine the mean, minimum, maximum and standard deviation of the variables. The variables in this study are stock returns, Trading Volume Activity, and Bid-Ask Spread.

Table 1. Data Descripton of Stock Return, Trading Volume Activity, and Bid-Ask Spread

	N	Minimum	Maximum	Mean	Std. Deviation
Return before SS	46	-0,8653	0,2462	0,0050	0,0564
Return after SS	46	-0,2308	0,3280	-0,0010	0,0498
TVA before SS	46	0,0000	0,0109	0,0008	0,0017
TVA after SS	46	0,0000	0,0387	0,0012	0,0030
BAS before SS	46	-2,0000	2,0000	0,2053	0,7615
BAS after SS	46	-2,0000	2,0000	0,1942	0,5612

In the stock return variable, the average minimum value of the period before the event is -0,8653 and its maximum value is 0,2462, the mean is 0,0050, with a standard deviation of 0,0564. As for the minimum average value of stock return after the event is -0,2308, its maximum value is 0,3280, and the mean is -0,0010, and its standard deviation is 0,0498.

In the Trading Volume Activity (TVA) variable, the average minimum value of the period before the event is 0,0000 and its maximum value is 0,0109, the mean is 0,0008, with a standard deviation of 0,0017. As for the average minimum value of TVA after the event is 0,0000, its maximum value is 0,0387, and the mean is 0,0012, and its standard deviation is 0,0030.

In the Bid-Ask Spread (BAS) variable, the average minimum value of pre-event period is -2,0000and its maximum value is 2,0000, the mean is 0,2053, with a standard deviation of 0,7615. As for the average minimum value of BAS after the event is -2,0000, its maximum value is 2,0000, and the mean is 0,1942, and its standard deviation is 0,5612.

B. Result of Research

1. Normality Test

Normality test is performed to determine whether the research data is normally distributed or not. In this study, the normality test used was Kolmogorov-Smirnov test with a significance level of 5%. Data is otherwise normally distributed if the significance is greater than 5% or 0.05 and the data is otherwise abnormally distributed if the significance is less than 5% or 0.05. The test results by using Kolmogorov Smirnov can be seen in the following table:

Table 2. The Normality Test Result for Stock Return

	Stock Return Before Stock Split	**Stock Return After Stock Split**	**Conclusion**
Test Statistic	0,220	0,155	Normally
Asymp. Sig. (2-tailed)	0,186	0,200	distributed

Based on normality test results in table 2 can be seen that the value of the significance of stock return before the stock split of 0.186

is greater than 0.05 which means stock return data before the stock split normally distributed. So also for the results of data significance after the stock split of 0.200 greater than 0.05 which means the data is normally distributed. From the results of normality test, this stock return can be concluded that the data is normally distributed and then can be tested paired sample t-test.

Table 3. The Normality Test Result for Trading Volume Activity

	TVA Before Stock Split	**TVA After Stock Split**	**Conclusion**
Test Statistic	0,245	0,262	Normally
Asymp. Sig. (2-tailed)	0,089	0,051	distributed

Based on normality test results in table 3, it can be seen that TVA value before and after the stock split event has significance value greater than 0,05 that is equal to 0,089 and 0,051. Based on these results the data can be said to be a normal distribution, then can be tested hypothesis in the form of paired sample t-test.

Table 4. The Normality Test Result for Bid-Ask Spread

	BAS Before Stock Split	**BAS After Stock Split**	**Conclusion**
Test Statistic	0,198	0,239	Normally
Asymp. Sig. (2-tailed)	0,200	0,109	distributed

Based on normality test results in table 4, it can be seen that Bid-Ask Spread value before and after the stock split event has significance value greater than 0,05 that is equal to 0,200 and 0,109. Based on these results the data can be said to be a normal distribution, then can be analyzed data test paired sample t-test.

2. Hypothesis Testing

The statistic analysis used in this research is paired sample t-test to test whether there is a difference of return and liquidity in 10 days before the stock split and 10 days after the stock split. Based on the results of the analysis using computer assistance program obtained the following results:

a. Hypothesis Testing 1

The first hypothesis testing is about the effect of the stock split on the stock return is done by collecting daily closing price data of each stock, the researcher then calculates the difference of the closing price on that day with the previous day to get actual return data. After knowing the actual return the researcher then does the t-test to know the significance of the stock return.

Table 5. The Hypothesis Test Result for The Average of Stock Return

Stock Return	T	Sig. (2 tailed)	Conclusion
Return before SS – Return after SS	1,488	0,171	H_{a1} is rejected

Based on the result paired sample t-test table 5, can be seen that the first hypothesis testing obtained t count value of 1.488 with a significance level of 0.171. These results show the significance value greater than $\alpha = 0.05$, it can be concluded that H_{a1} which states that there is a significant difference in the actual return around the stock split activity is rejected.

b. Hypothesis Testing 2

The second hypothesis testing in this study is to prove that there is a difference in TVA before and after the stock split. This hypothesis testing using paired sample t-test with the following results:

Table 6. The Hypothesis Test Result for The Average of Trading Volume Activity

TVA	T	Sig. (2 tailed)	Conclusion
TVA before SS – TVA after SS	-3,365	0,008	H_{a2} is accepted

Based on the result paired sample t-test table 6, can be seen that the second hypothesis test obtained t value counted -3.365 with a significance level of 0.008. The result shows the significance value smaller than $\alpha = 0.05$, it can be concluded that H_{a2} which states that there is a significant difference in Trading Volume Activity around the stock split activity accepted.

c. Hypothesis Testing 3

The third hypothesis testing in this study is to prove that there is a difference in the Bid-Ask Spread before and after the stock split, this hypothesis test using paired sample t-test with the results as follows:

Table 7. The Hypothesis Test Result for The Average of Bid-Ask Spread

Bid Ask Spread	T	Sig. (2 tailed)	Conclusion
BAS before SS – BAS after SS	-0,490	0,636	H_{a3} is rejected

Based on the results paired sample t-test table 7 can be seen that the third hypothesis test obtained t value counted -0.490 with a significance level of 0.636. The result shows the significance value greater than $\alpha = 0.05$, it can be concluded that H_{a3} which states that there is a significant difference in Bid-Ask Spread around the stock split activity is rejected.

C. Discussion

This study tested three hypotheses. The following is a discussion of each hypothesis:

1. First Hypothesis

Based on the results of paired sample t-test shows a significant value of 0.171 is greater than the significance level of 0,05 so that the results obtained there is no significant difference in stock returns on 10 days before and 10 days after the stock split. From this observation can be seen that the average stock return before the stock split is greater than the average stock return after the stock split. This causes the stock split can not generate a return for investors. This difference is due to different market reactions, where stock splits are perceived as not a tremendous political occurrence so that investors do not react highly to this incident.

The results of this study are in line with research conducted Andi Setyawan (2015), Permadi (2011), and Wang Sutrisno (2000) which states no difference in stock returns in the period before and after stock split, but contrary to research conducted by I Gusti Ayu (2010) and Ikenberry, Rankie, & Stice (1996) stating that there is a significant difference of stock returns in the period before stock split and after the stock split.

2. Second Hypothesis

Based on the results of the study of 46 samples of companies taken, there is a difference in the average TVA in 10 days before and after the stock split event. This is evidenced from the results of testing paired sample t-test on TVA 10 days before and 10 days after stock splitting, obtained the average TVA before the stock split of 0.000809 and for after 0.001213 with a value of t -3.365. As for the level of significance produced by 0.008 smaller than the level of significance that has been set that is 0,05 (0,008<0,05). Based on these results indicate that there are differences of TVA before and after the stock split event. The results of this study prove that the hypothesis one (H_{a2}) are accepted and the null hypothesis (H_{02}) is rejected. Based on the above discussion shows that the existence of information to the capital market caused a significant reaction on TVA before and after the event of a stock split.

The results of this study in accordance with the theory of Trading Range Theory, which explains that stock split will increase stock liquidity. In this hypothesis, TVA as a proxy of stock liquidity. The results of this study also support research from Fatima Nur Izza (2016) and Wijanarko (2012) which proves that there is a difference in trading volume before and after the stock split event. This is because the stock price is affordable by investors and the state of Indonesia's stable economy, hence encourage investors to conduct more frequent transactions on these shares. And the results of this study differ from the

results of research Andi Setywan (2015), Slamet Lestari (2008), and Iguh Wijanarko (2012).

3. Third Hypothesis

Based on the table 7, it can be seen that the third hypothesis testing obtained t count value of -0.490. The value indicates that there is a spread difference before the stock split and after the stock split. The value of t of this test is negative, it indicates that the spread that occurred before the stock split is smaller than after the stock split. While the significance level of 0.636. The significance value is greater than $\alpha = 0.05$, meaning that H_{a3} which states that there is a significant difference in Bid-Ask Spread (BAS) around the stock split activity is rejected.

The results of this study indicate that the spread that occurred after stock split actually increased. This shows that a stock split is not able to lower Bid-Ask Spread. This study does not support the trading range theory. In theory, if the stock price is lower, the investor will be more interested. Bid-Ask Spread that increase after the stock split indicates that the bid price and the ask price have a great distance. This makes difficult to reach the price agreements in the capital market. If the price gap between the bid price and the ask price is difficult to meet, then trading activity will also be hampered. Inhibition of this trading activity makes liquidity decline.

This increase can be caused by investors who are less interested to conduct transactions on the shares. Investors tend to choose to hold their

shares as opposed to selling their shares. They feel that with the stock split, the stock will actually decrease in price. Investors are more afraid of losing than wanting to profit, so they choose to hold their shares.

The results of this study differ from the results of research from Andi Setyawan (2015) and Bachtiar (2013), but in line with the research finding of Janiantari et al (2014) and Dennis (2003).

D. Limitations of Research

In analyzing the effect of the stock split on stock return and liquidity, this research has limitations that need to be malicious, such as:

1. The researcher does not divide the company that performs a stock split based on firm size, company type, or split factor, whereas there is a possibility that the company doing a stock split with the different type of company, or split factor will cause a different market reaction.
2. The researcher use an actual return as a proxy of stock return,whereas there is a possibility different result if the researcher use an abnormal return as a proxy of stock return.
3. The researcher does not use a control group to compare companies that do the stock split and do not do a stock split, the use of this control group will yield more reliable proof.
4. The number of research samples are small.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

A. Conclusions

This study examines the effect of stock split events on returns and stock liquidity that proxied using TVA and bid-ask spread. From the results of testing the hypothesis that has been done, researchers can draw some conclusions as follows:

1. There is no significant difference in the stock returns on 10 days before and 10 days after the stock split. From this observation can be seen that the average stock return before the stock split is greater than the average stock return after the stock split. This causes the stock split can not generate a return for investors. This difference is due to different market reactions, where stock split are perceived as not a tremendous political occurrence so that investors do not react highly to this incident.
2. The stock liquidity that proxied with Trading Volume Activity (TVA) shows a significant difference in TVA between 10 days before and after the stock split occurs. The results of this study in accordance with the theory of Trading Range Theory, which explains that stock split will increase stock liquidity. This is because the stock price is affordable by investors and the state of Indonesia's stable economy,

hence encourage investors to conduct more frequent transactions on these shares.

3. There is no significant different in Bid-Ask Spread between before and after the stock split event. The decrease Bid-Ask Spread implies an increase in stock liquidity due to lower demand and stock offering prices, making stock transactions more likely. This increase can be caused by investors who are less interested to conduct transactions on the shares. Investors tend to choose to hold their shares as opposed to selling their shares. They feel that with the stock split, the stock will actually decrease in price. Investors are more afraid of losing than wanting to profit, so they choose to hold their shares.

B. Suggestions

Given the limitations in this study, researchers have provided suggestions for further research, including:

1. Classify the companies doing a stock split into several subsamples, so researchers can know the different effect of a stock split event to some subsample.
2. In this research to calculate stock return using an actual return as a proxy, for further research an abnormal return can be used as a proxy for a stock return to represent the market reaction.

3. Use a control group to compare companies that do the stock split with companies that do not do the stock split, and add samples to get the better result.
4. Using a statistical tool known as meta-analysis to analyze more research findings from many previous studies.

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APPENDICES

Appendix 1. Data Samples of This Research

NO	DATE	CODE	NAME	RASIO
1	19 Mei 2015	LEAD	Logindo Samudramakmur Tbk	1:4
2	31 Juli 2015	ASJT	Asuransi Jasa Tania Tbk	1:2
3	03 Agustus 2015	CEKA	Wilmar Cahaya Indonesia Tbk	1:2
4	02 September 2015	LMSH	Lionmesh Prima Tbk	1:10
5	02 September 2015	LION	Lion Metal Works Tbk	1:10
6	16 Oktober 2015	MIKA	Mitra Keluarga Karyasehat Tbk	1:10
7	19 Oktober 2015	DSNG	Dharma Satya Nusantara Tbk	1:5
8	03 Nopember 2015	DLTA	Delta Djakarta Tbk	1:50
9	21 Desember 2015	MERK	Merck Tbk	1:20
10	01 Februari 2016	TIRA	Tira Austenite Tbk	1:10
11	25 Februari 2016	KONI	Perdana Bangun Pusaka Tbk	1:2
12	24 Maret 2016	ALKA	Alakasa Industrindo Tbk	1:5
13	10 Juni 2016	RAJA	Rukun Raharja Tbk	1:4
14	17 Juni 2016	HMSP	Hm Sampoerna Tbk	1:25
15	22 Juni 2016	PSAB	J Resources Asia Pasifik Tbk	1:5
16	28 Juni 2016	KREN	Kresna Graha Investama Tbk	1:5
17	11 Juli 2016	ERTX	Eratex Djaja Tbk	1:8
18	25 Juli 2016	TBMS	Tembaga Mulia Semanan Tbk	1:20
19	19 Juli 2016	PADI	Minna Padi Investama Tbk	1:4
20	01 Agustus 2016	ICBP	Indofood Cbp Sukses Makmur Tbk	1:2
21	04 Agustus 2016	BTON	Betonjaya Manunggal Tbk	1:4
22	05 Agustus 2016	AIMS	Akbar Indo Makmur Stimec Tbk	1:2
23	19 Agustus 2017	MYRX	Hanson International Tbk	1:5
24	16 September 2016	ITMA	Sumber Energi Andalan Tbk	1:20
25	26 September 2016	IKBI	Sumi Indo Kabel Tbk	1:4
26	25 Oktober 2016	TOTO	Surya Toto Indonesia Tbk	1:10
27	21 Februari 2017	PPRO	Pp Properti Tbk, Pt	1:4
28	31 Maret 2017	KKGI	Resource Alam Indonesia Tbk, Pt	1:5

NO	DATE	CODE	NAME	RASIO
29	23 Mei 2017	LPIN	Pt. Multi Prima Sejahtera Tbk	1:5
30	24 Mei 2017	IIKP	Inti Agri Resources Tbk, Pt	1:10
31	07 Juni 2017	SAME	Sarana Meditama Metropolitan Tbk. Pt	1:5
32	08 Juni 2017	BFIN	Bfi Finance Indonesia Tbk, Pt	1:10
33	19 Juni 2017	INTD	Inter Delta Tbk, Pt	1:5
34	06 Juli 2017	VOKS	Voksel Electric Tbk, Pt	1:5
35	17 Juli 2017	BRPT	Barito Pacific Tbk, Pt	1:2
36	09 Agustus 2019	SMDR	Samudera Indonesia Tbk, Pt	1:20
37	15 Agustus 2017	ULTJ	Ultrajaya Milk Industry & Trading Company Tbk, Pt	1:4
38	21 Agustus 2017	BTEK	Bumi Teknokultura Unggul Tbk, Pt	1:8
39	14 September 2017	MEDC	Medco Energi Internasional Tbk, Pt	1:4
40	18 September 2017	BMRI	Bank Mandiri (Persero) Tbk, Pt	1:2
41	26 Oktober 2017	INAI	Indal Aluminium Industry Tbk, Pt	1:2
42	01 Nopember 2017	ESSA	Surya Esa Perkasa Tbk, Pt	1:10
43	15 Nopember 2017	BBRI	Bank Rakyat Indonesia (Persero) Tbk, Pt	1:5
44	20 Nopember 2017	MKNT	Mitra Komunikasi Nusantara Tbk, Pt	1:5
45	24 Nopember 2017	TPIA	Chandra Asri Petrochemical Tbk, Pt.	1:5
46	19 Desember 2017	PTBA	Tambang Batubara Bukit Asam (Persero) Pt, Tbk	1:5

Appendix 2. Data of Stock Price to Calculate The Stock Return

T	LEAD	ASJT	CEKA	LMSH	LION	MIKA	DSNG	DLTA	MERK	TIRA	KONI	ALKA	RAJA	HMSP	PSAB
t-10	1.305	284	1.265	5.200	9.100	30.000	2.880	245.500	128.000	1.440	260	710	845	95.000	1.480
t-9	1.350	284	1.305	5.200	8.500	29.900	2.890	245.500	128.000	1.440	260	710	850	98.000	1.495
t-8	1.295	284	1.305	5.200	8.500	30.000	2.920	253.400	128.000	1.435	260	710	865	98.475	1.480
t-7	1.255	290	1.305	5.200	8.500	28.950	2.975	250.000	128.000	1.435	260	710	865	98.600	1.495
t-6	1.300	290	1.310	5.200	8.500	28.500	2.975	250.000	128.000	1.435	260	710	855	99.000	1.495
t-5	1.300	290	1.310	5.200	8.500	28.200	3.000	250.000	128.000	1.435	260	710	850	99.800	1.495
t-4	1.305	290	1.310	4.730	8.500	27.450	3.150	255.100	129.000	1.435	324	685	845	99.275	1.495
t-3	1.315	290	1.335	5.500	8.500	28.200	3.150	255.100	129.000	1.440	400	685	830	97.850	1.570
t-2	1.435	250	1.335	5.500	9.500	27.775	3.300	265.000	130.000	1.440	375	685	895	95.625	1.575
t-1	1.425	310	1.350	5.500	1.280	28.025	3.500	270.000	130.250	1.440	430	685	890	95.150	1.610
t 0	353	155	685	550	1.140	2.940	730	5.875	6.700	149	230	160	248	3.880	324
t+1	340	145	690	495	1.300	2.945	740	6.600	6.500	155	230	160	246	3.660	336
t+2	330	140	690	495	1.345	2.970	725	6.200	6.775	180	240	160	242	3.740	356
t+3	331	140	700	500	1.295	2.910	775	6.000	6.800	214	241	160	236	3.750	358
t+4	328	140	695	500	1.200	2.800	740	5.650	6.775	201	241	160	228	3.800	342
t+5	331	140	695	500	1.200	2.775	700	5.525	6.775	183	241	160	218	3.790	340
t+6	335	140	690	466	1.285	2.800	695	5.700	6.750	183	241	160	222	3.730	370
t+7	326	140	650	550	1.175	2.805	670	5.550	6.750	223	241	160	216	3.650	358
t+8	315	140	670	540	1.290	2.775	645	5.100	6.625	215	241	160	214	3.670	350
t+9	320	140	680	540	1.280	2.750	620	5.125	6.775	215	241	160	224	3.630	354
t+10	311	140	680	540	1.280	2.795	600	5.125	6.750	215	241	160	224	3.660	356

T	KREN	ERTX	TBMS	PADI	ICBP	BTON	AIMS	MYRX	ITMA	IKBI	TOTO	PPRO	IKGI	LPIN	IIKP
t-10	2.270	1.300	8.250	920	17.350	515	304	770	14.525	1.795	6.150	1.265	2.290	6.175	2.490
t-9	2.260	1.300	8.250	920	17.000	535	304	765	14.900	1.795	6.150	1.260	2.330	6.175	2.500
t-8	2.260	1.300	8.250	920	17.000	530	304	780	16.000	1.795	6.175	1.260	2.330	6.175	2.360
t-7	2.230	1.300	8.250	920	16.925	530	304	770	16.000	1.795	6.175	1.260	2.390	6.075	2.340
t-6	2.230	1.300	8.250	920	17.125	530	304	770	16.000	1.795	6.150	1.260	2.360	6.075	2.390
t-5	2.280	1.300	8.250	920	17.450	525	304	765	15.500	1.795	6.125	1.260	2.370	6.075	2.410
t-4	2.260	1.300	8.250	920	17.200	525	304	745	18.600	1.790	6.150	1.265	2.300	6.075	2.430
t-3	2.210	1.300	9.900	920	17.375	525	304	755	22.300	1.705	6.125	1.300	2.330	6.075	2.430
t-2	2.120	1.300	10.000	920	17.550	525	304	770	26.750	1.705	6.150	1.290	2.330	6.075	2.470
t-1	2.060	1.450	12.000	880	17.900	525	304	780	32.100	1.695	6.225	1.280	2.390	6.075	2.390
t 0	412	224	750	262	9.000	130	152	169	1.445	400	665	346	496	1.215	238
t+1	410	226	935	260	8.850	129	152	169	1.305	386	695	342	484	1.350	238
t+2	410	236	950	244	8.600	120	152	169	1.175	418	700	334	454	1.350	238
t+3	412	238	1.015	242	8.925	120	180	167	1.375	386	690	334	458	1.350	240
t+4	414	224	915	238	8.800	122	180	166	1.375	388	670	320	466	1.200	242
t+5	420	224	890	228	8.800	125	180	161	1.420	408	650	306	462	1.130	246
t+6	422	226	860	224	8.850	125	175	165	1.280	380	660	292	454	1.300	254
t+7	430	230	905	226	8.925	166	175	165	1.380	380	650	270	450	1.300	276
t+8	428	230	865	224	8.825	155	175	161	1.370	376	655	328	450	1.000	254
t+9	424	230	870	226	8.750	145	220	160	1.370	380	650	304	460	995	232
t+10	410	230	900	220	8.750	150	220	159	1.330	380	640	304	454	1.165	236

T	SAME	BFIN	INTD	VOKS	BRPT	SMDR	ULTJ	BTEK	MEDC	BMRI	INAI	ESSA	BBRI	MKNT	TPIA	PTBA
t-10	2.790	4.600	1.180	1.770	3.000	5.850	5.000	1.060	3.000	13.100	730	1.950	15.600	1.410	27.900	11.250
t-9	2.800	5.000	1.180	1.780	2.820	5.800	5.000	1.080	3.090	13.100	740	2.080	15.550	1.405	28.300	11.250
t-8	2.790	4.900	1.180	1.760	2.930	5.650	5.000	1.060	3.100	13.100	740	2.080	15.600	1.405	28.450	11.475
t-7	2.810	5.000	1.180	1.800	2.980	5.775	4.950	1.065	3.270	13.050	780	2.050	15.700	1.335	28.800	11.200
t-6	2.790	5.100	1.180	1.770	2.970	5.925	5.050	1.050	3.300	13.075	780	2.200	15.950	1.315	28.850	11.100
t-5	2.830	5.000	1.180	1.800	2.940	6.000	5.000	1.050	3.250	12.950	780	2.100	16.000	1.300	28.450	10.950
t-4	2.840	5.100	1.180	1.750	3.000	5.925	5.000	1.100	3.300	13.025	780	2.100	16.250	1.300	28.500	11.050
t-3	2.820	5.000	1.180	1.770	2.980	5.875	5.000	1.170	3.400	13.275	780	2.100	16.200	1.270	28.250	10.925
t-2	2.850	5.150	1.180	1.770	2.980	6.000	5.025	1.260	3.390	13.200	785	2.100	16.450	1.270	28.300	11.000
t-1	2.850	5.000	1.180	1.800	2.970	6.100	4.950	1.245	3.490	13.200	785	1.900	16.450	1.250	28.975	11.200
t 0	550	520	252	450	1.490	300	1.235	166	910	6.575	394	190	3.280	258	5.650	2.240
t+1	565	520	258	386	1.485	292	1.210	173	860	6.550	398	190	3.260	258	5.750	2.280
t+2	570	520	210	378	1.500	290	1.205	173	805	6.625	396	179	3.170	254	5.700	2.260
t+3	570	540	210	376	1.560	292	1.185	173	785	6.575	412	180	3.140	254	5.700	2.460
t+4	565	520	210	374	1.620	286	1.185	167	755	6.600	410	180	3.210	250	5.600	2.460
t+5	560	525	210	370	1.620	288	1.200	159	740	6.600	394	170	3.290	246	5.500	2.550
t+6	565	520	210	372	1.595	284	1.180	157	845	6.600	394	170	3.340	252	5.700	2.520
t+7	550	525	210	368	1.540	284	1.180	150	895	6.575	370	170	3.280	248	5.475	2.510
t+8	555	530	210	340	1.550	284	1.170	158	920	6.550	370	169	3.400	242	5.500	2.500
t+9	560	520	210	340	1.595	284	1.170	159	880	6.600	362	170	3.360	248	5.450	2.460
t+10	550	520	210	300	1.650	284	1.185	157	850	6.575	362	167	3.350	250	5.450	2.500

Appendix 3. Data of Volume and Outstanding Stock to Calculate Treding Volume Activity (TVA)

T	LEAD		ASJT		CEKA		LMSH		LION		MIKA	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	1.121.400	644.257.143	0	300.000.000	19.500	297.500.000	500	9.600.000	0	52.016.000	2.154.900	1.455.073.600
t-9	1.012.900	644.257.143	0	300.000.000	25.700	297.500.000	0	9.600.000	1.000	52.016.000	2.217.500	1.455.073.600
t-8	753.200	644.257.143	0	300.000.000	500	297.500.000	0	9.600.000	0	52.016.000	2.197.600	1.455.073.600
t-7	905.600	644.257.143	2.000	300.000.000	4.700	297.500.000	0	9.600.000	0	52.016.000	2.829.600	1.455.073.600
t-6	1.074.700	644.257.143	0	300.000.000	6.600	297.500.000	0	9.600.000	0	52.016.000	2.731.200	1.455.073.600
t-5	854.700	644.257.143	0	300.000.000	0	297.500.000	0	9.600.000	0	52.016.000	2.704.300	1.455.073.600
t-4	531.100	644.257.143	0	300.000.000	8.800	297.500.000	500	9.600.000	0	52.016.000	2.684.300	1.455.073.600
t-3	1.630.400	644.257.143	0	300.000.000	18.100	297.500.000	100	9.600.000	0	52.016.000	4.149.800	1.455.073.600
t-2	3.784.100	644.257.143	300	300.000.000	300	297.500.000	0	9.600.000	19.500	52.016.000	2.643.700	1.455.073.600
t-1	2.065.700	644.257.143	3.100	300.000.000	16.700	297.500.000	0	9.600.000	0	520.160.000	2.927.800	1.455.073.600
t 0	3.022.000	2.577.028.572	1.300	600.000.000	85.400	595.000.000	0	96.000.000	7.200	520.160.000	63.884.900	14.550.736.000
t+1	2.871.600	2.577.028.572	32.000	600.000.000	10.500	595.000.000	43.700	96.000.000	15.100	520.160.000	39.763.000	14.550.736.000
t+2	2.616.400	2.577.028.572	400	600.000.000	11.600	595.000.000	0	96.000.000	100	520.160.000	46.150.900	14.550.736.000
t+3	2.563.000	2.577.028.572	0	600.000.000	7.400	595.000.000	6.300	96.000.000	600	520.160.000	35.346.000	14.550.736.000
t+4	2.935.400	2.577.028.572	6.100	600.000.000	1.600	595.000.000	0	96.000.000	500	520.160.000	39.268.400	14.550.736.000
t+5	2.092.100	2.577.028.572	0	600.000.000	0	595.000.000	27.900	96.000.000	0	520.160.000	51.732.400	14.550.736.000
t+6	596.500	2.577.028.572	0	600.000.000	4.100	595.000.000	700	96.000.000	100	520.160.000	41.373.100	14.550.736.000
t+7	2.557.600	2.577.028.572	0	600.000.000	13.800	595.000.000	400	96.000.000	31.500	520.160.000	45.152.000	14.550.736.000
t+8	2.300.100	2.577.028.572	0	600.000.000	6.400	595.000.000	500	96.000.000	300	520.160.000	39.718.900	14.550.736.000
t+9	416.800	2.577.028.572	0	600.000.000	2.300	595.000.000	0	96.000.000	300	520.160.000	44.577.000	14.550.736.000
t+10	896.500	2.577.028.572	0	600.000.000	0	595.000.000	0	96.000.000	0	520.160.000	37.919.300	14.550.736.000

T	DSNG		DLTA		MERK		TIRA		KONI		ALKA	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	351.800	2.119.700.000	100	16.013.181	0	22.400.000	0	58.800.000	0	76.000.000	0	10.153.301
t-9	542.800	2.119.700.000	500	16.013.181	0	22.400.000	0	58.800.000	0	76.000.000	0	101.533.011
t-8	271.200	2.119.700.000	8.000	16.013.181	0	22.400.000	3.000	58.800.000	0	76.000.000	0	101.533.011
t-7	466.500	2.119.700.000	100	16.013.181	100	22.400.000	0	58.800.000	0	76.000.000	0	101.533.011
t-6	117.200	2.119.700.000	0	16.013.181	0	22.400.000	100	58.800.000	0	76.000.000	0	101.533.011
t-5	184.700	2.119.700.000	0	16.013.181	0	22.400.000	0	58.800.000	0	76.000.000	0	101.533.011
t-4	518.500	2.119.700.000	400	16.013.181	21.000	22.400.000	0	58.800.000	400	76.000.000	900	101.533.011
t-3	95.100	2.119.700.000	0	16.013.181	100	22.400.000	300	58.800.000	400	76.000.000	1.200	101.533.011
t-2	651.300	2.119.700.000	2.700	16.013.181	4.000	22.400.000	0	58.800.000	6.400	76.000.000	0	101.533.011
t-1	591.200	2.119.700.000	900	16.013.181	200	22.400.000	800	5.880.000	800	76.000.000	200	101.533.011
t 0	1.815.900	10.598.500.000	63.200	800.659.050	20.200	448.000.000	26.100	588.000.000	5.900	152.000.000	2.600	507.665.055
t+1	2.485.200	10.598.500.000	115.000	800.659.050	8.600	448.000.000	10.100	588.000.000	800	152.000.000	21.700	507.665.055
t+2	1.976.400	10.598.500.000	36.500	800.659.050	4.600	448.000.000	500	588.000.000	400	152.000.000	400	507.665.055
t+3	3.671.800	10.598.500.000	66.700	800.659.050	3.900	448.000.000	32.000	588.000.000	200	152.000.000	0	507.665.055
t+4	1.397.100	10.598.500.000	24.500	800.659.050	8.300	448.000.000	9.400	588.000.000	0	152.000.000	0	507.665.055
t+5	1.163.300	10.598.500.000	29.400	800.659.050	8.300	448.000.000	7.600	588.000.000	0	152.000.000	0	507.665.055
t+6	910.900	10.598.500.000	3.300	800.659.050	1.600	448.000.000	5.700	588.000.000	0	152.000.000	4.100	507.665.055
t+7	870.500	10.598.500.000	14.100	800.659.050	13.700	448.000.000	300	588.000.000	0	152.000.000	100	507.665.055
t+8	660.400	10.598.500.000	4.800	800.659.050	11.100	448.000.000	10.000	588.000.000	0	152.000.000	0	507.665.055
t+9	1.017.800	10.598.500.000	18.000	800.659.050	2.600	448.000.000	15.100	588.000.000	0	152.000.000	0	507.665.055
t+10	935.900	10.598.500.000	18.000	800.659.050	800	448.000.000	11.100	588.000.000	0	152.000.000	0	507.665.055

T	RAJA		HMSP		PSAB		KREN		ERTX	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	1.075.700	1.019.270.625	2.745.200	4.652.723.076	4.179.700	5.292.000.000	6.336.400	3.641.694.020	0	160.817.474
t-9	624.300	1.019.270.625	621.700	4.652.723.076	4.337.600	5.292.000.000	5.432.500	3.641.694.020	0	160.817.474
t-8	2.205.100	1.019.270.625	479.500	4.652.723.076	4.179.700	5.292.000.000	2.794.300	3.641.694.020	0	160.817.474
t-7	986.900	1.019.270.625	413.300	4.652.723.076	4.337.600	5.292.000.000	2.603.900	3.641.694.020	0	160.817.474
t-6	455.200	1.019.270.625	409.600	4.652.723.076	789.600	5.292.000.000	3.274.900	3.641.694.020	0	160.817.474
t-5	661.300	1.019.270.625	515.000	4.652.723.076	817.000	5.292.000.000	11.811.400	3.641.694.020	0	160.817.474
t-4	474.700	1.019.270.625	594.900	4.652.723.076	1.227.700	5.292.000.000	11.209.900	3.641.694.020	0	160.817.474
t-3	391.900	1.019.270.625	477.900	4.652.723.076	3.689.700	5.292.000.000	2.689.500	3.641.694.020	0	160.817.474
t-2	4.115.400	1.019.270.625	843.000	4.652.723.076	1.300.300	5.292.000.000	3.591.000	3.641.694.020	700	160.817.474
t-1	2.219.300	1.019.270.625	654.800	4.652.723.076	7.030.900	5.292.000.000	6.565.300	3.641.694.020	2.900	160.817.474
t 0	56.107.600	4.077.082.500	16.756.200	116.318.076.900	17.748.900	26.460.000.000	57.534.100	18.208.470.100	42.200	1.286.539.792
t+1	51.834.600	4.077.082.500	37.650.900	116.318.076.900	23.355.600	26.460.000.000	22.792.000	18.208.470.100	36.600	1.286.539.792
t+2	52.091.500	4.077.082.500	19.029.800	116.318.076.900	38.646.000	26.460.000.000	21.154.000	18.208.470.100	100	1.286.539.792
t+3	70.004.400	4.077.082.500	12.440.000	116.318.076.900	26.340.200	26.460.000.000	13.288.500	18.208.470.100	1.300	1.286.539.792
t+4	38.227.500	4.077.082.500	14.056.600	116.318.076.900	46.722.100	26.460.000.000	19.029.000	18.208.470.100	30.900	1.286.539.792
t+5	42.283.100	4.077.082.500	9.896.300	116.318.076.900	47.907.300	26.460.000.000	28.587.400	18.208.470.100	0	1.286.539.792
t+6	5.926.300	4.077.082.500	16.663.600	116.318.076.900	88.448.300	26.460.000.000	13.926.100	18.208.470.100	200	1.286.539.792
t+7	4.144.200	4.077.082.500	17.556.800	116.318.076.900	33.819.000	26.460.000.000	19.102.100	18.208.470.100	10.000	1.286.539.792
t+8	3.578.900	4.077.082.500	17.534.300	116.318.076.900	32.170.600	26.460.000.000	12.564.400	18.208.470.100	2.100	1.286.539.792
t+9	5.173.400	4.077.082.500	5.396.000	116.318.076.900	39.747.000	26.460.000.000	8.575.700	18.208.470.100	0	1.286.539.792
t+10	9.625.100	4.077.082.500	22.860.000	116.318.076.900	16.549.700	26.460.000.000	8.853.600	18.208.470.100	0	1.286.539.792

T	TBMS		PADI		ICBP		BTON		AIMS	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	0	18.367.000	100	2.826.811.631	3.649.600	5.830.954.000	1.000	180.000.000	0	110.000.000
t-9	0	18.367.000	0	2.826.811.631	2.462.700	5.830.954.000	12.500	180.000.000	0	110.000.000
t-8	0	18.367.000	0	2.826.811.631	2.679.600	5.830.954.000	700	180.000.000	0	110.000.000
t-7	0	18.367.000	0	2.826.811.631	1.285.200	5.830.954.000	0	180.000.000	0	110.000.000
t-6	0	18.367.000	0	2.826.811.631	2.665.500	5.830.954.000	0	180.000.000	0	110.000.000
t-5	0	18.367.000	0	2.826.811.631	2.923.000	5.830.954.000	300	180.000.000	0	110.000.000
t-4	0	18.367.000	200	2.826.811.631	2.072.200	5.830.954.000	0	180.000.000	0	110.000.000
t-3	3.000	18.367.000	22.600	2.826.811.631	1.098.900	5.830.954.000	52.800	180.000.000	0	110.000.000
t-2	700	18.367.000	2.200	2.826.811.631	2.011.900	5.830.954.000	15.800	180.000.000	0	110.000.000
t-1	1.200	18.367.000	87.200	2.826.811.631	2.344.600	5.830.954.000	34.700	180.000.000	0	110.000.000
t 0	31.800	367.340.000	24.693.500	11.307.246.524	4.065.900	11.661.908.000	22.000	720.000.000	0	220.000.000
t+1	281.500	367.340.000	32.852.500	11.307.246.524	5.184.700	11.661.908.000	105.400	720.000.000	0	220.000.000
t+2	197.300	367.340.000	1.300.600	11.307.246.524	4.375.700	11.661.908.000	1.032.300	720.000.000	24.800	220.000.000
t+3	51.900	367.340.000	238.800	11.307.246.524	6.696.600	11.661.908.000	405.200	720.000.000	4.100	220.000.000
t+4	58.600	367.340.000	290.900	11.307.246.524	4.632.500	11.661.908.000	42.800	720.000.000	0	220.000.000
t+5	15.800	367.340.000	914.400	11.307.246.524	3.499.700	11.661.908.000	715.900	720.000.000	0	220.000.000
t+6	5.300	367.340.000	112.300	11.307.246.524	3.189.300	11.661.908.000	4.421.300	720.000.000	1.100	220.000.000
t+7	12.400	367.340.000	29.000	11.307.246.524	2.868.200	11.661.908.000	3.929.700	720.000.000	0	220.000.000
t+8	3.800	367.340.000	612.800	11.307.246.524	5.042.800	11.661.908.000	27.834.900	720.000.000	0	220.000.000
t+9	6.900	367.340.000	647.900	11.307.246.524	4.529.600	11.661.908.000	441.000	720.000.000	2.600	220.000.000
t+10	3.000	367.340.000	207.300	11.307.246.524	3.952.600	11.661.908.000	118.400	720.000.000	0	220.000.000

T	MYRX		ITMA		IKBI		TOTO		PPRO	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	145.759.100	15.743.840.235	0	34.000.000	100	306.000.000	225.300	1.032.000.000	11.735.200	14.044.406.000
t-9	137.419.000	15.743.840.235	3.000	34.000.000	0	306.000.000	298.900	1.032.000.000	3.143.200	14.044.406.000
t-8	123.328.200	15.743.840.235	2.400	34.000.000	0	306.000.000	270.700	1.032.000.000	6.836.300	14.044.406.000
t-7	104.357.700	15.743.840.235	0	34.000.000	0	306.000.000	260.100	1.032.000.000	4.059.100	14.044.406.000
t-6	158.988.600	15.743.840.235	100	34.000.000	0	306.000.000	189.100	1.032.000.000	7.099.700	14.044.406.000
t-5	148.244.400	15.743.840.235	2.000	34.000.000	0	306.000.000	165.200	1.032.000.000	6.756.300	14.044.406.000
t-4	142.756.700	15.743.840.235	9.100	34.000.000	31.800	306.000.000	276.700	1.032.000.000	6.408.800	14.044.406.000
t-3	75.636.500	15.743.840.235	14.100	34.000.000	27.600	306.000.000	494.000	1.032.000.000	21.127.100	14.044.406.000
t-2	156.667.400	15.743.840.235	3.200	34.000.000	3.800	306.000.000	838.000	1.032.000.000	11.908.700	14.044.406.000
t-1	172.339.900	15.743.840.235	5.200	34.000.000	16.300	306.000.000	614.900	1.032.000.000	9.779.900	14.044.406.000
t 0	1.239.947.600	78.719.201.175	119.900	680.000.000	2.100	1.224.000.000	15.525.600	1.032.000.000	197.225.000	56.177.624.000
t+1	362.576.500	78.719.201.175	40.400	680.000.000	10.000	1.224.000.000	11.690.400	10.320.000.000	88.767.800	56.177.624.000
t+2	281.830.000	78.719.201.175	64.300	680.000.000	37.600	1.224.000.000	17.986.900	10.320.000.000	33.831.900	56.177.624.000
t+3	549.032.400	78.719.201.175	361.500	680.000.000	59.700	1.224.000.000	17.847.000	10.320.000.000	33.831.900	56.177.624.000
t+4	514.339.300	78.719.201.175	80.800	680.000.000	9.600	1.224.000.000	14.759.700	10.320.000.000	58.868.100	56.177.624.000
t+5	924.117.800	78.719.201.175	6.200	680.000.000	5.200	1.224.000.000	12.344.400	10.320.000.000	62.718.300	56.177.624.000
t+6	739.230.700	78.719.201.175	23.400	680.000.000	63.500	1.224.000.000	14.586.000	10.320.000.000	57.423.500	56.177.624.000
t+7	644.410.400	78.719.201.175	39.000	680.000.000	4.100	1.224.000.000	7.015.700	10.320.000.000	128.891.900	56.177.624.000
t+8	739.082.500	78.719.201.175	1.900	680.000.000	700	1.224.000.000	10.514.100	10.320.000.000	577.316.100	56.177.624.000
t+9	736.463.600	78.719.201.175	900	680.000.000	13.600	1.224.000.000	12.330.400	10.320.000.000	295.222.600	56.177.624.000
t+10	663.107.500	78.719.201.175	6.100	680.000.000	0	1.224.000.000	4.799.300	10.320.000.000	170.220.900	56.177.624.000

T	KKGI		LPIN		IIKP		SAME		BFIN	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	233.600	1.000.000.000	0	21.250.000	9.870.800	3.360.000.000	204.500	1.180.000.000	800	1.596.711.562
t-9	94.300	1.000.000.000	0	21.250.000	29.726.900	3.360.000.000	257.000	1.180.000.000	14.400	1.596.711.562
t-8	182.400	1.000.000.000	0	21.250.000	14.905.400	3.360.000.000	304.800	1.180.000.000	43.400	1.596.711.562
t-7	239.500	1.000.000.000	23.200	21.250.000	9.987.300	3.360.000.000	246.500	1.180.000.000	1.656.000	1.596.711.562
t-6	224.800	1.000.000.000	0	21.250.000	25.113.700	3.360.000.000	205.300	1.180.000.000	318.100	1.596.711.562
t-5	8.200	1.000.000.000	0	21.250.000	17.221.600	3.360.000.000	225.400	1.180.000.000	381.600	1.596.711.562
t-4	17.600	1.000.000.000	0	21.250.000	15.771.100	3.360.000.000	215.900	1.180.000.000	257.800	1.596.711.562
t-3	12.400	1.000.000.000	0	21.250.000	16.256.100	3.360.000.000	230.900	1.180.000.000	330.300	1.596.711.562
t-2	71.400	1.000.000.000	0	21.250.000	27.463.200	3.360.000.000	279.800	1.180.000.000	261.100	1.596.711.562
t-1	177.000	1.000.000.000	3.000	21.250.000	30.591.000	3.360.000.000	274.200	1.180.000.000	4.100	1.596.711.562
t 0	3.947.800	5.000.000.000	0	106.250.000	158.978.500	33.600.000.000	1.083.200	5.900.000.000	20.129.800	15.967.115.620
t+1	4.770.400	5.000.000.000	1.000	106.250.000	112.684.900	33.600.000.000	1.564.600	5.900.000.000	3.542.600	15.967.115.620
t+2	2.145.600	5.000.000.000	1.000	106.250.000	247.293.100	33.600.000.000	1.086.500	5.900.000.000	2.453.100	15.967.115.620
t+3	1.158.600	5.000.000.000	0	106.250.000	241.634.000	33.600.000.000	1.918.200	5.900.000.000	17.849.700	15.967.115.620
t+4	905.900	5.000.000.000	21.500	106.250.000	259.963.400	33.600.000.000	1.144.500	5.900.000.000	95.800	15.967.115.620
t+5	10.221.100	5.000.000.000	500	106.250.000	180.865.300	33.600.000.000	1.198.400	5.900.000.000	280.300	15.967.115.620
t+6	1.625.300	5.000.000.000	236.000	106.250.000	228.951.500	33.600.000.000	1.171.600	5.900.000.000	1.782.500	15.967.115.620
t+7	561.700	5.000.000.000	236.000	106.250.000	137.633.100	33.600.000.000	1.199.100	5.900.000.000	8.950.700	15.967.115.620
t+8	1.552.400	5.000.000.000	57.700	106.250.000	228.045.500	33.600.000.000	1.683.800	5.900.000.000	3.848.200	15.967.115.620
t+9	1.215.900	5.000.000.000	600	106.250.000	310.007.900	33.600.000.000	1.439.800	5.900.000.000	2.019.300	15.967.115.620
t+10	706.600	5.000.000.000	500	106.250.000	244.318.700	33.600.000.000	1.280.800	5.900.000.000	4.561.900	15.967.115.620

T	INTD		VOKS		BRPT		SMDR		ULTJ	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	0	118.365.600	33.000	831.120.519	18.852.700	6.979.892.784	36.600	163.756.000	207.500	2.888.382.000
t-9	0	118.365.600	26.100	831.120.519	36.967.700	6.979.892.784	45.100	163.756.000	265.600	2.888.382.000
t-8	0	118.365.600	29.800	831.120.519	25.105.900	6.979.892.784	53.100	163.756.000	536.000	2.888.382.000
t-7	0	118.365.600	92.000	831.120.519	20.496.100	6.979.892.784	22.200	163.756.000	177.400	2.888.382.000
t-6	0	118.365.600	58.100	831.120.519	13.073.300	6.979.892.784	26.900	163.756.000	15.600	2.888.382.000
t-5	0	118.365.600	98.100	831.120.519	15.327.600	6.979.892.784	31.200	163.756.000	3.300	2.888.382.000
t-4	0	118.365.600	94.800	831.120.519	18.102.500	6.979.892.784	41.100	163.756.000	202.400	2.888.382.000
t-3	0	118.365.600	130.000	831.120.519	12.461.300	6.979.892.784	42.100	163.756.000	305.600	2.888.382.000
t-2	0	118.365.600	104.900	831.120.519	8.700.100	6.979.892.784	201.400	163.756.000	40.400	2.888.382.000
t-1	0	118.365.600	127.100	831.120.519	15.753.000	6.979.892.784	387.700	163.756.000	262.600	2.888.382.000
t 0	15.200	591.828.000	409.300	4.155.602.595	41.211.200	13.959.785.568	7.769.100	3.275.120.000	205.700	11.553.528.000
t+1	30.400	591.828.000	189.100	4.155.602.595	22.839.800	13.959.785.568	1.127.800	3.275.120.000	95.600	11.553.528.000
t+2	22.000	591.828.000	368.100	4.155.602.595	29.116.700	13.959.785.568	1.359.900	3.275.120.000	30.900	11.553.528.000
t+3	0	591.828.000	56.700	4.155.602.595	44.664.100	13.959.785.568	2.333.500	3.275.120.000	57.500	11.553.528.000
t+4	7.600	591.828.000	50.100	4.155.602.595	47.313.100	13.959.785.568	1.351.000	3.275.120.000	57.100	11.553.528.000
t+5	2.500	591.828.000	10.600	4.155.602.595	40.622.900	13.959.785.568	1.527.900	3.275.120.000	125.200	11.553.528.000
t+6	0	591.828.000	103.400	4.155.602.595	19.301.500	13.959.785.568	698.400	3.275.120.000	97.000	11.553.528.000
t+7	100	591.828.000	43.800	4.155.602.595	22.206.600	13.959.785.568	2.120.100	3.275.120.000	116.100	11.553.528.000
t+8	0	591.828.000	371.800	4.155.602.595	18.687.100	13.959.785.568	469.500	3.275.120.000	83.400	11.553.528.000
t+9	0	591.828.000	11.500	4.155.602.595	31.131.000	13.959.785.568	1.072.900	3.275.120.000	4.350.600	11.553.528.000
t+10	0	591.828.000	146.500	4.155.602.595	42.955.600	13.959.785.568	1.056.700	3.275.120.000	406.800	11.553.528.000

T	BTEK		MEDC		BMRI		INAI		ESSA	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	8.500	5.784.687.047	5.382.500	3.332.451.450	20.846.600	23.099.999.999	69.200	316.800.000	4.900	1.100.000.000
t-9	800	5.784.687.047	13.321.200	3.332.451.450	12.057.100	23.099.999.999	60.200	316.800.000	300	1.100.000.000
t-8	5.000	5.784.687.047	17.133.000	3.332.451.450	17.275.200	23.099.999.999	365.800	316.800.000	0	1.100.000.000
t-7	1.000	5.784.687.047	12.825.100	3.332.451.450	17.317.100	23.099.999.999	237.100	316.800.000	600	1.100.000.000
t-6	300	5.784.687.047	13.421.200	3.332.451.450	13.355.800	23.099.999.999	4.200	316.800.000	36.600	1.100.000.000
t-5	3.000	5.784.687.047	5.692.300	3.332.451.450	31.592.100	23.099.999.999	60.300	316.800.000	36.700	1.100.000.000
t-4	333.200	5.784.687.047	7.284.400	3.332.451.450	11.386.100	23.099.999.999	45.500	316.800.000	5.600	1.100.000.000
t-3	30.200	5.784.687.047	9.699.000	3.332.451.450	23.197.000	23.099.999.999	113.600	316.800.000	13.300	1.100.000.000
t-2	117.100	5.784.687.047	13.100.800	3.332.451.450	12.761.600	23.099.999.999	101.400	316.800.000	7.700	1.100.000.000
t-1	134.600	5.784.687.047	12.100.800	3.332.451.450	12.870.500	23.099.999.999	57.600	316.800.000	61.600	1.100.000.000
t 0	7.279.000	46.277.496.376	78.444.200	13.329.805.800	11.134.900	46.199.999.998	89.000	633.600.000	1.574.800	11.000.000.000
t+1	19.268.700	46.277.496.376	45.440.000	13.329.805.800	16.193.500	46.199.999.998	161.500	633.600.000	517.800	11.000.000.000
t+2	905.800	46.277.496.376	70.003.200	13.329.805.800	48.288.500	46.199.999.998	35.600	633.600.000	303.900	11.000.000.000
t+3	59.294.900	46.277.496.376	51.802.000	13.329.805.800	15.601.500	46.199.999.998	62.900	633.600.000	308.700	11.000.000.000
t+4	33.779.000	46.277.496.376	66.328.600	13.329.805.800	32.813.800	46.199.999.998	23.500	633.600.000	190.900	11.000.000.000
t+5	4.827.200	46.277.496.376	45.218.800	13.329.805.800	76.154.100	46.199.999.998	16.100	633.600.000	442.400	11.000.000.000
t+6	1.156.600	46.277.496.376	122.519.400	13.329.805.800	44.165.800	46.199.999.998	255.500	633.600.000	1.837.600	11.000.000.000
t+7	1.434.200	46.277.496.376	181.586.900	13.329.805.800	27.522.900	46.199.999.998	112.900	633.600.000	7.430.200	11.000.000.000
t+8	22.715.100	46.277.496.376	124.304.900	13.329.805.800	47.042.700	46.199.999.998	42.900	633.600.000	1.191.200	11.000.000.000
t+9	10.904.600	46.277.496.376	74.484.100	13.329.805.800	60.907.100	46.199.999.998	43.300	633.600.000	2.510.500	11.000.000.000
t+10	1.008.400	46.277.496.376	170.633.300	13.329.805.800	28.024.800	46.199.999.998	33.000	633.600.000	730.500	11.000.000.000

T	BBRI		MKNT		TPIA		PTBA	
	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK	VOLUME	OUTSTANDING STOCK
t-10	26.913.700	24.422.470.380	1.114.900	1.000.000.000	2.449.400	3.566.704.052	5.966.100	2.304.131.850
t-9	23.142.300	24.422.470.380	1.217.300	1.000.000.000	2.419.800	3.566.704.052	4.084.800	2.304.131.850
t-8	24.869.500	24.422.470.380	1.099.600	1.000.000.000	2.136.800	3.566.704.052	5.292.500	2.304.131.850
t-7	9.721.000	24.422.470.380	1.541.300	1.000.000.000	1.867.600	3.566.704.052	3.691.600	2.304.131.850
t-6	24.334.500	24.422.470.380	1.197.400	1.000.000.000	2.097.100	3.566.704.052	1.304.300	2.304.131.850
t-5	14.803.300	24.422.470.380	1.161.900	1.000.000.000	1.798.500	3.566.704.052	1.418.400	2.304.131.850
t-4	31.650.600	24.422.470.380	1.299.000	1.000.000.000	2.151.800	3.566.704.052	1.921.800	2.304.131.850
t-3	15.829.100	24.422.470.380	1.384.800	1.000.000.000	1.985.500	3.566.704.052	2.124.600	2.304.131.850
t-2	39.637.100	24.422.470.380	1.647.800	1.000.000.000	1.860.600	3.566.704.052	2.080.000	2.304.131.850
t-1	37.413.400	24.422.470.380	3.094.500	1.000.000.000	2.344.800	3.566.704.052	4.845.500	2.304.131.850
t 0	100.147.400	122.112.351.900	4.887.000	5.000.000.000	8.531.000	17.833.520.260	17.020.600	11.520.659.250
t+1	55.986.100	122.112.351.900	4.551.600	5.000.000.000	8.486.100	17.833.520.260	12.516.000	11.520.659.250
t+2	105.187.300	122.112.351.900	4.168.400	5.000.000.000	7.457.400	17.833.520.260	10.645.100	11.520.659.250
t+3	79.049.700	122.112.351.900	4.721.900	5.000.000.000	7.664.300	17.833.520.260	79.232.400	11.520.659.250
t+4	78.015.200	122.112.351.900	4.613.900	5.000.000.000	8.208.700	17.833.520.260	46.183.200	11.520.659.250
t+5	114.054.700	122.112.351.900	4.202.000	5.000.000.000	8.238.600	17.833.520.260	59.619.100	11.520.659.250
t+6	92.309.000	122.112.351.900	4.324.400	5.000.000.000	10.441.700	17.833.520.260	25.920.200	11.520.659.250
t+7	109.824.700	122.112.351.900	4.084.900	5.000.000.000	6.670.200	17.833.520.260	20.194.800	11.520.659.250
t+8	147.637.500	122.112.351.900	4.539.600	5.000.000.000	8.428.000	17.833.520.260	13.912.700	11.520.659.250
t+9	49.703.700	122.112.351.900	4.522.000	5.000.000.000	6.483.800	17.833.520.260	16.900.100	11.520.659.250
t+10	82.715.200	122.112.351.900	5.606.100	5.000.000.000	5.220.600	17.833.520.260	22.905.300	11.520.659.250

Appendix 4. Data of Bid and Offer Price to Calculate The Bid-Ask Spread

T	LEAD		ASJT		CEKA		LMSH		LION		MIKA		DSNG	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	1.330	1.305	340	245	1.300	1.265	5.200	4.125	9.950	8.500	30.000	29.900	2.880	2.855
t-9	1.360	1.350	285	240	1.330	1.305	5.875	4.225	9.500	7.500	29.975	29.900	2.890	2.870
t-8	1.310	1.295	283	274	1.325	1.300	5.875	0	8.800	7.500	30.000	29.950	2.920	2.890
t-7	1.270	1.255	290	241	1.340	1.305	5.875	0	9.000	7.800	28.975	28.950	2.975	2.950
t-6	1.305	1.300	290	240	1.310	1.305	5.850	4.680	9.000	7.700	28.550	28.500	2.975	2.960
t-5	1.300	1.295	285	240	1.330	1.165	5.875	0	9.500	7.700	28.200	28.175	3.000	2.990
t-4	1.305	1.300	290	240	1.310	1.205	4.900	4.730	9.500	7.700	27.475	27.450	3.150	3.125
t-3	1.325	1.315	340	240	1.330	1.205	5.500	4.350	9.500	9.000	28.250	28.200	3.150	3.105
t-2	1.440	1.435	291	270	1.330	1.185	5.575	4.950	10.200	9.500	27.850	27.775	3.300	3.120
t-1	1.425	1.420	0	290	1.350	1.300	5.875	4.950	1.265	0	28.025	28.000	3.500	3.475
t 0	353	352	155	136	695	685	630	505	1.145	1.100	2.940	2.935	730	725
t+1	340	339	145	140	695	685	495	0	1.300	1.200	2.950	2.945	740	730
t+2	330	329	149	140	700	690	500	475	1.345	1.180	2.975	2.970	725	715
t+3	331	328	140	120	700	690	500	450	1.295	1.215	2.910	2.905	780	770
t+4	328	327	140	120	695	655	500	456	1.295	1.180	2.810	2.800	750	740
t+5	332	331	155	121	700	625	495	456	1.200	1.175	2.780	2.775	705	700
t+6	335	327	150	120	690	630	525	466	1.270	1.180	2.800	2.795	695	690
t+7	326	324	150	120	650	610	525	466	1.200	1.175	2.810	2.805	675	670
t+8	315	314	149	120	670	635	540	495	1.280	1.105	2.780	2.775	650	645
t+9	320	314	140	100	680	620	540	505	1.275	1.175	2.750	2.740	640	620
t+10	312	311	155	120	690	565	550	490	1.265	0	2.795	2.790	620	600

T	DLTA		MERK		TIRA		KONI		ALKA		RAJA		HMSP	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	250.000	245.000	129.000	123.000	1.440	0	0	0	690	0	845	835	95.125	95.000
t-9	246.500	245.000	129.500	125.000	1.440	0	260	0	690	0	855	850	98.025	97.525
t-8	253.400	222.700	128.950	123.000	1.440	0	0	0	685	0	870	865	98.475	98.325
t-7	257.400	0	128.950	127.000	1.440	0	0	0	690	0	870	865	98.600	97.725
t-6	255.000	245.500	128.950	122.000	1.440	0	0	0	690	0	860	855	99.000	98.925
t-5	255.000	245.500	129.000	122.000	1.440	0	260	0	690	0	850	845	99.800	99.500
t-4	265.000	255.600	129.925	129.000	1.440	1.400	324	260	680	640	850	845	99.500	99.275
t-3	260.000	252.100	129.975	128.500	1.440	1.390	400	0	685	665	835	830	98.000	97.850
t-2	280.000	265.000	149.500	129.100	1.440	0	390	375	685	630	900	895	95.700	95.625
t-1	280.000	270.000	130.325	129.000	1.440	0	430	0	685	655	895	890	95.475	95.150
t 0	5.900	5.875	6.650	6.550	149	0	230	200	160	140	250	248	3.880	3.870
t+1	6.600	6.575	6.600	6.475	150	135	230	0	160	0	246	244	3.670	3.660
t+2	6.400	6.200	6.775	6.525	180	140	240	0	163	160	242	240	3.750	3.740
t+3	6.200	6.000	6.800	6.625	214	0	236	0	159	0	236	234	3.750	3.730
t+4	5.725	5.650	6.800	6.775	201	195	230	0	159	0	230	228	3.800	3.790
t+5	5.850	5.525	6.800	6.775	183	0	236	0	158	0	218	216	3.790	3.770
t+6	5.625	5.575	6.750	6.725	185	175	240	0	158	0	222	220	3.730	3.720
t+7	5.550	5.325	6.750	6.700	215	175	238	0	159	0	218	216	3.660	3.650
t+8	5.300	5.100	6.750	6.650	210	0	230	0	160	0	214	212	3.670	3.640
t+9	5.125	5.025	6.775	6.650	210	0	217	0	163	0	226	224	3.650	3.630
t+10	5.125	5.025	6.750	6.650	214	0	217	0	162	0	224	222	3.680	3.660

T	PSAB		KREN		ERTX		TBMS		PADI		ICBP		BTON	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	1.485	1.480	2.270	2.260	1.350	0	0	8.275	920	860	17.350	17.200	515	490
t-9	1.500	1.495	2.260	2.250	1.400	0	0	8.250	920	865	17.025	17.000	535	515
t-8	1.485	1.480	2.260	2.250	1.400	0	0	8.250	920	860	17.000	16.975	530	500
t-7	1.500	1.495	2.230	2.220	1.400	0	0	8.250	920	860	17.000	16.925	525	492
t-6	1.500	1.495	2.230	2.220	1.300	0	0	8.250	920	860	17.125	17.100	525	490
t-5	1.500	1.495	2.280	2.250	1.400	0	0	8.250	920	860	17.450	17.400	525	500
t-4	1.500	1.495	2.270	2.260	1.310	1.170	9.900	8.250	920	860	17.250	17.200	525	500
t-3	1.570	1.565	2.220	2.210	1.310	1.170	0	9.700	910	880	17.375	17.350	525	515
t-2	1.580	1.575	2.130	2.110	1.300	1.170	11.475	9.900	925	920	17.575	17.550	525	515
t-1	1.610	1.605	2.060	2.050	1.450	1.430	0	0	910	880	17.900	17.875	525	515
t 0	326	324	414	412	224	206	0	750	262	260	9.000	8.975	130	125
t+1	338	336	410	408	232	228	0	935	260	258	8.900	8.850	127	117
t+2	358	356	410	408	230	210	950	945	244	242	8.625	8.600	123	119
t+3	360	358	412	410	234	214	1.010	950	244	242	8.950	8.925	121	120
t+4	346	342	416	414	236	226	915	0	240	238	8.800	8.775	121	120
t+5	342	340	420	418	234	228	890	840	228	226	8.800	8.750	128	125
t+6	372	370	422	420	226	208	860	850	228	224	8.850	8.775	128	125
t+7	358	356	430	426	232	228	910	905	226	222	8.925	8.825	166	165
t+8	352	350	428	426	230	222	880	860	224	222	8.825	8.725	155	154
t+9	354	352	424	422	232	210	915	870	232	226	8.750	8.725	145	144
t+10	358	356	410	408	232	222	890	880	232	220	8.750	8.700	150	140

T	AIMS		MYRX		ITMA		IKBI		TOTO		PPRO		KKGI	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	304	0	770	765	16.000	14.525	1.795	1.620	6.150	6.125	1.265	1.260	2.290	2.260
t-9	304	0	770	765	16.500	14.575	1.795	0	6.150	6.125	1.265	1.260	2.330	2.290
t-8	304	0	780	775	16.750	15.575	1.795	1.700	6.175	6.150	1.265	1.260	2.380	2.330
t-7	304	0	775	770	16.000	15.225	1.795	1.700	6.175	6.100	1.265	1.260	2.390	2.340
t-6	304	0	770	765	16.500	15.600	1.795	1.700	6.150	6.100	1.260	1.255	2.360	2.330
t-5	304	0	765	760	16.000	15.000	1.795	0	6.125	6.050	1.265	1.260	2.360	2.270
t-4	0	0	745	740	0	18.600	1.795	1.635	6.150	6.125	1.270	1.265	2.300	2.290
t-3	0	280	765	755	0	22.300	1.705	1.690	6.150	6.125	1.305	1.300	2.330	2.290
t-2	0	286	770	745	0	26.750	1.740	1.705	6.300	6.150	1.290	1.285	2.340	2.330
t-1	0	288	780	770	0	32.100	1.700	1.680	6.225	6.200	1.280	1.275	2.400	2.390
t 0	198	0	169	168	1.495	0	420	390	665	660	348	346	496	494
t+1	0	0	170	169	1.305	0	400	360	700	695	344	342	486	484
t+2	200	140	169	168	1.175	0	438	418	700	695	334	332	454	452
t+3	180	175	167	166	1.410	1.375	414	386	690	685	334	332	458	456
t+4	190	180	166	162	1.375	1.305	400	388	675	665	322	320	468	466
t+5	190	175	161	160	1.420	1.300	408	362	655	650	306	304	464	462
t+6	180	175	165	164	1.285	1.280	380	376	660	655	294	292	454	452
t+7	200	165	165	162	1.375	1.300	380	374	650	645	272	270	452	446
t+8	170	165	161	160	1.365	1.280	376	352	655	650	328	326	450	448
t+9	220	175	160	157	1.340	1.275	380	376	655	650	306	304	458	456
t+10	210	0	159	158	1.340	1.280	416	378	640	635	306	304	458	454

T	LPIN		IIKP		SAME		BFIN		INTD		VOKS		BRPT	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	6.100	0	2.500	2.490	2.790	2.770	4.750	4.600	1.200	0	1.770	1.750	3.010	3.000
t-9	6.150	0	2.500	2.400	2.800	2.790	5.000	4.630	1.200	0	1.780	1.450	2.820	2.810
t-8	6.150	0	2.360	2.350	2.800	2.790	4.950	4.900	1.250	0	1.880	1.760	2.940	2.930
t-7	6.100	0	2.350	2.340	2.810	2.790	5.025	4.900	1.200	0	1.850	1.740	2.980	2.970
t-6	6.100	0	2.390	2.340	2.790	2.780	5.100	4.900	1.200	885	1.770	1.730	2.970	2.960
t-5	6.075	0	2.430	2.380	2.830	2.820	5.000	4.900	1.300	0	1.790	1.710	2.940	2.930
t-4	6.075	0	2.440	2.400	2.840	2.820	5.150	5.100	1.350	0	1.795	1.750	3.000	2.990
t-3	6.075	0	2.460	2.430	2.820	2.800	5.100	5.000	1.250	0	1.770	1.750	2.980	2.970
t-2	6.075	0	2.470	2.440	2.850	2.820	5.150	4.880	1.350	0	1.770	1.750	2.990	2.980
t-1	6.075	0	2.400	2.380	2.850	2.830	5.000	4.850	1.350	0	1.800	1.780	2.970	2.960
t 0	1.490	0	238	236	550	545	525	515	270	252	0	450	1.490	1.475
t+1	1.350	0	240	238	575	565	530	520	260	0	386	380	1.485	1.480
t+2	1.325	1.020	238	236	575	570	530	500	210	0	378	372	1.500	1.495
t+3	1.300	1.200	242	240	575	570	540	535	188	175	376	374	1.560	1.555
t+4	1.200	1.050	244	242	565	560	520	510	210	175	374	372	1.620	1.615
t+5	1.450	905	246	244	560	555	525	500	210	0	370	368	1.620	1.615
t+6	1.350	850	254	244	565	560	520	500	200	0	372	364	1.595	1.590
t+7	1.200	1.060	276	254	555	550	525	520	210	0	370	366	1.540	1.535
t+8	1.050	1.000	254	252	555	550	530	525	210	0	350	340	1.550	1.545
t+9	1.000	860	232	230	560	555	525	520	210	0	342	332	1.595	1.590
t+10	1.155	860	236	234	560	550	535	515	200	0	318	300	1.650	1.645

T	SMDR		ULTJ		BTEK		MEDC		BMRI		INAI		ESSA	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	5.900	5.850	5.075	5.000	1.095	1.060	3.000	2.990	13.150	13.100	735	730	2.080	1.960
t-9	5.850	5.800	5.025	5.000	1.080	1.070	3.100	3.090	13.125	13.100	740	730	2.060	2.000
t-8	5.750	5.650	5.000	4.950	1.075	1.065	3.110	3.100	13.125	13.100	775	740	2.050	1.850
t-7	5.800	5.750	4.950	4.920	1.085	1.065	3.270	3.260	13.075	13.050	785	765	2.040	1.865
t-6	5.925	5.900	5.050	5.000	1.090	1.025	3.300	3.290	13.075	13.050	790	780	2.200	1.950
t-5	5.975	5.900	5.050	5.000	1.075	1.055	3.260	3.250	12.975	12.950	790	780	2.270	2.060
t-4	5.975	5.925	5.025	5.000	1.100	1.090	3.300	3.290	13.050	13.025	795	780	2.100	1.940
t-3	5.950	5.875	5.050	5.000	1.175	1.170	3.400	3.390	13.275	13.250	785	780	2.100	1.940
t-2	6.025	6.000	5.025	5.000	1.260	1.255	3.390	3.380	13.250	13.200	785	780	2.100	1.950
t-1	6.100	6.075	4.950	4.940	1.275	1.235	3.490	3.480	13.225	13.200	785	780	1.900	1.890
t 0	302	300	1.235	1.210	166	165	910	905	6.575	6.550	396	394	190	189
t+1	294	292	1.210	1.205	174	173	865	860	6.550	6.525	398	394	190	187
t+2	292	290	1.210	1.200	174	173	805	800	6.625	6.600	400	396	180	179
t+3	292	290	1.195	1.185	173	170	790	785	6.575	6.550	410	394	180	177
t+4	290	286	1.195	1.185	167	166	755	750	6.600	6.575	410	384	180	178
t+5	288	284	1.200	1.190	159	158	745	740	6.600	6.575	394	390	179	170
t+6	286	284	1.180	1.175	157	156	845	840	6.600	6.575	394	376	170	169
t+7	286	282	1.180	1.175	153	150	900	895	6.600	6.575	372	370	170	169
t+8	284	282	1.175	1.170	158	157	920	915	6.575	6.550	370	362	170	169
t+9	284	282	1.170	1.165	159	158	885	880	6.600	6.575	366	362	170	169
t+10	284	282	1.185	1.170	157	156	850	845	6.600	6.575	374	362	173	166

T	BBRI		MKNT		TPIA		PTBA	
	OFFER	BID	OFFER	BID	OFFER	BID	OFFER	BID
t-10	15.600	15.575	1.420	1.410	27.900	27.850	11.275	11.250
t-9	15.575	15.550	1.410	1.400	28.300	28.100	11.375	11.250
t-8	15.625	15.600	1.405	1.400	28.575	28.450	11.475	11.450
t-7	15.700	15.650	1.340	1.335	28.800	28.700	11.200	11.175
t-6	15.950	15.925	1.315	1.310	28.850	28.825	11.175	11.100
t-5	16.000	15.975	1.300	1.290	28.500	28.450	10.975	10.950
t-4	16.250	16.225	1.300	1.295	28.525	28.500	11.075	11.050
t-3	16.200	16.175	1.280	1.270	28.250	28.200	10.950	10.925
t-2	16.475	16.450	1.275	1.270	28.300	28.275	11.025	11.000
t-1	16.475	16.450	1.260	1.250	28.975	28.525	11.200	11.175
t 0	3.280	3.270	262	258	5.650	5.625	2.250	2.240
t+1	3.270	3.260	258	254	5.750	5.725	2.280	2.270
t+2	3.180	3.170	254	252	5.700	5.650	2.260	2.250
t+3	3.180	3.140	256	254	5.700	5.650	2.460	2.450
t+4	3.220	3.210	252	250	5.600	5.575	2.460	2.450
t+5	3.290	3.280	250	246	5.500	5.475	2.550	2.540
t+6	3.350	3.340	254	252	5.725	5.700	2.530	2.520
t+7	3.290	3.280	248	246	5.475	5.450	2.520	2.510
t+8	3.400	3.390	244	242	5.500	5.450	2.500	2.490
t+9	3.360	3.350	248	246	5.475	5.450	2.460	2.450
t+10	3.360	3.350	254	250	5.475	5.450	2.500	2.490

Appendix 5. The Calculation Results of Stock Return

T	LEAD	ASJT	CEKA	LMSH	LION	MIKA	DSNG	DLTA	MERK	TIRA	KONI	ALKA	RAJA	HMSP	PSAB
t-10	-0,0333	0,0000	-0,0269	0,0196	0,0000	0,0144	-0,0237	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0104	0,1840
t-9	0,0345	0,0000	0,0316	0,0000	-0,0659	-0,0033	0,0035	0,0000	0,0000	0,0000	0,0000	0,0000	0,0059	0,0316	0,0101
t-8	-0,0407	0,0000	0,0000	0,0000	0,0000	0,0033	0,0104	0,0322	0,0000	-0,0035	0,0000	0,0000	0,0176	0,0048	-0,0100
t-7	-0,0309	0,0211	0,0000	0,0000	0,0000	-0,0350	0,0188	-0,0134	0,0000	0,0000	0,0000	0,0000	0,0000	0,0013	0,0101
t-6	0,0359	0,0000	0,0038	0,0000	0,0000	-0,0155	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0116	0,0041	0,0000
t-5	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0105	0,0084	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0058	0,0081	0,0000
t-4	0,0038	0,0000	0,0000	-0,0904	0,0000	-0,0266	0,0500	0,0204	0,0078	0,0000	0,2462	-0,0352	-0,0059	-0,0053	0,0000
t-3	0,0077	0,0000	0,0191	0,1628	0,0000	0,0273	0,0000	0,0000	0,0000	0,0035	0,2346	0,0000	-0,0178	-0,0144	0,0502
t-2	0,0913	-0,1379	0,0000	0,0000	0,1176	-0,0151	0,0476	0,0388	0,0078	0,0000	-0,0625	0,0000	0,0783	-0,0227	0,0032
t-1	-0,0070	0,2400	0,0112	0,0000	-0,8653	0,0090	0,0606	0,0189	0,0019	0,0000	0,1467	0,0000	-0,0056	-0,0050	0,0222
t 0	-0,7523	-0,5000	-0,4926	-0,9000	-0,1094	-0,8951	-0,7914	-0,9782	-0,9486	-0,8965	-0,4651	-0,7664	-0,7213	-0,9592	-0,7988
t+1	-0,0368	-0,0645	0,0073	-0,1000	0,1404	0,0017	0,0137	0,1234	-0,0299	0,0403	0,0000	0,0000	-0,0081	-0,0567	0,0370
t+2	-0,0294	-0,0345	0,0000	0,0000	0,0346	0,0085	-0,0203	-0,0606	0,0423	0,1613	0,0435	0,0000	-0,0163	0,0219	0,0595
t+3	0,0030	0,0000	0,0145	0,0101	-0,0372	-0,0202	0,0690	-0,0323	0,0037	0,1889	0,0042	0,0000	-0,0248	0,0027	0,0056
t+4	-0,0091	0,0000	-0,0071	0,0000	-0,0734	-0,0378	-0,0452	-0,0583	-0,0037	-0,0607	0,0000	0,0000	-0,0339	0,0133	-0,0447
t+5	0,0091	0,0000	0,0000	0,0000	0,0000	-0,0089	-0,0541	-0,0221	0,0000	-0,0896	0,0000	0,0000	-0,0439	-0,0026	-0,0058
t+6	0,0121	0,0000	-0,0072	-0,0680	0,0708	0,0090	-0,0071	0,0317	-0,0037	0,0000	0,0000	0,0000	0,0183	-0,0158	0,0882
t+7	-0,0269	0,0000	-0,0580	0,1803	-0,0856	0,0018	-0,0360	-0,0263	0,0000	0,2186	0,0000	0,0000	-0,0270	-0,0214	-0,0324
t+8	-0,0337	0,0000	0,0308	-0,0182	0,0979	-0,0107	-0,0373	-0,0811	-0,0185	-0,0359	0,0000	0,0000	-0,0093	0,0055	-0,0223
t+9	0,0159	0,0000	0,0149	0,0000	-0,0078	-0,0090	-0,0388	0,0049	0,0226	0,0000	0,0000	0,0000	0,0467	-0,0109	0,0114
t+10	-0,0281	0,0000	0,0000	0,0000	0,0000	0,0164	-0,0323	0,0000	-0,0037	0,0000	0,0000	0,0000	0,0000	0,0083	0,0056

T	KREN	ERTX	TBMS	PADI	ICBP	BTON	AIMS	MYRX	ITMA	IKBI	TOTO	PPRO	IKGI	LPIN	IIKP	SAME
t-10	0,0000	0,0000	0,0000	0,0000	-0,0029	-0,0096	0,0000	-0,0065	0,0000	0,0000	0,0000	0,0000	-0,0458	0,0000	0,0289	0,0000
t-9	-0,0044	0,0000	0,0000	0,0000	-0,0202	0,0388	0,0000	-0,0065	0,0258	0,0000	0,0000	-0,0040	0,0175	0,0000	0,0040	0,0036
t-8	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0093	0,0000	0,0196	0,0738	0,0000	0,0041	0,0000	0,0000	0,0000	-0,0560	-0,0036
t-7	-0,0133	0,0000	0,0000	0,0000	-0,0044	0,0000	0,0000	-0,0128	0,0000	0,0000	0,0000	0,0000	0,0258	-0,0162	-0,0085	0,0072
t-6	0,0000	0,0000	0,0000	0,0000	0,0118	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0040	0,0000	-0,0126	0,0000	0,0214	-0,0071
t-5	0,0224	0,0000	0,0000	0,0000	0,0190	-0,0094	0,0000	-0,0065	-0,0313	0,0000	-0,0041	0,0000	0,0042	0,0000	0,0084	0,0143
t-4	-0,0088	0,0000	0,0000	0,0000	-0,0143	0,0000	0,0000	-0,0261	0,2000	-0,0028	0,0041	0,0040	-0,0295	0,0000	0,0083	0,0035
t-3	-0,0221	0,0000	0,2000	0,0000	0,0102	0,0000	0,0000	0,0134	0,1989	-0,0475	-0,0041	0,0277	0,0130	0,0000	0,0000	-0,0070
t-2	-0,0407	0,0000	0,0101	0,0000	0,0101	0,0000	0,0000	0,0199	0,1996	0,0000	0,0041	-0,0077	0,0000	0,0000	0,0165	0,0106
t-1	-0,0283	0,1154	0,2000	-0,0435	0,0199	0,0000	0,0000	0,0130	0,2000	-0,0059	0,0122	-0,0078	0,0258	0,0000	-0,0324	0,0000
t 0	-0,8000	-0,8455	-0,9375	-0,7023	-0,4972	-0,7524	-0,5000	-0,7833	-0,9550	-0,7640	-0,8932	-0,7297	-0,7925	-0,8000	-0,9004	-0,8070
t+1	-0,0049	0,0089	0,2467	-0,0076	-0,0167	-0,0077	0,0000	0,0000	-0,0969	-0,0350	0,0451	-0,0116	-0,0242	0,1111	0,0000	0,0273
t+2	0,0000	0,0442	0,0160	-0,0615	-0,0282	-0,0698	0,0000	0,0000	-0,0996	0,0829	0,0072	-0,0234	-0,0620	0,0000	0,0000	0,0088
t+3	0,0049	0,0085	0,0684	-0,0082	0,0378	0,0000	0,1842	-0,0118	0,1702	-0,0766	-0,0143	0,0000	0,0088	0,0000	0,0084	0,0000
t+4	0,0049	-0,0588	-0,0985	-0,0165	-0,0140	0,0167	0,0000	-0,0060	0,0000	0,0052	-0,0290	-0,0419	0,0175	-0,1111	0,0083	-0,0088
t+5	0,0145	0,0000	-0,0273	-0,0420	0,0000	0,0246	0,0000	-0,0301	0,0327	0,0515	-0,0299	-0,0438	-0,0086	-0,0583	0,0165	-0,0088
t+6	0,0048	0,0089	-0,0337	-0,0175	0,0057	0,0000	-0,0278	0,0248	-0,0986	-0,0686	0,0154	-0,0458	-0,0173	0,1504	0,0325	0,0089
t+7	0,0190	0,0177	0,0523	0,0089	0,0085	0,3280	0,0000	0,0000	0,0781	0,0000	-0,0152	-0,0753	-0,0088	0,0000	0,0866	-0,0265
t+8	-0,0047	0,0000	-0,0442	-0,0088	-0,0112	-0,0663	0,0000	-0,0242	-0,0072	-0,0105	0,0077	0,2148	0,0000	-0,2308	-0,0797	0,0091
t+9	-0,0093	0,0000	0,0058	0,0089	-0,0085	-0,0645	0,2571	-0,0062	0,0000	0,0106	-0,0076	-0,0732	0,0222	-0,0050	-0,0866	0,0090
t+10	-0,0330	0,0000	0,0345	-0,0265	0,0000	0,0345	0,0000	-0,0063	-0,0292	0,0000	-0,0154	0,0000	-0,0130	0,1709	0,0172	-0,0179

T	BFIN	INTD	VOKS	BRPT	SMDR	ULTJ	BTEK	MEDC	BMRI	INAI	ESSA	BBRI	MKNT	TPIA	PTBA	MEAN
t-10	0,0000	0,0000	-0,0167	0,0638	-0,0085	0,0000	-0,0185	0,0000	0,0000	0,0139	-0,0758	-0,0016	-0,0070	0,0027	0,0000	0,0009
t-9	0,0870	0,0000	0,0056	-0,0600	-0,0085	0,0000	0,0189	0,0300	0,0000	0,0137	0,0667	-0,0032	-0,0035	0,0143	0,0000	0,0057
t-8	-0,0200	0,0000	-0,0112	0,0390	-0,0259	0,0000	-0,0185	0,0032	0,0000	0,0000	0,0000	0,0032	0,0000	0,0053	0,0200	0,0008
t-7	0,0204	0,0000	0,0227	0,0171	0,0221	-0,0100	0,0047	0,0548	-0,0038	0,0541	-0,0144	0,0064	-0,0498	0,0123	-0,0240	0,0014
t-6	0,0200	0,0000	-0,0167	-0,0034	0,0260	0,0202	-0,0141	0,0092	0,0019	0,0000	0,0732	0,0159	-0,0150	0,0017	-0,0089	0,0030
t-5	-0,0196	0,0000	0,0169	-0,0101	0,0127	-0,0099	0,0000	-0,0152	-0,0096	0,0000	-0,0455	0,0031	-0,0114	-0,0139	-0,0135	-0,0021
t-4	0,0200	0,0000	-0,0278	0,0204	-0,0125	0,0000	0,0476	0,0154	0,0058	0,0000	0,0000	0,0156	0,0000	0,0018	0,0091	0,0087
t-3	-0,0196	0,0000	0,0114	-0,0067	-0,0084	0,0000	0,0636	0,0303	0,0192	0,0000	0,0000	-0,0031	-0,0231	-0,0088	-0,0113	0,0195
t-2	0,0300	0,0000	0,0000	0,0000	0,0213	0,0050	0,0769	-0,0029	-0,0056	0,0064	0,0000	0,0154	0,0000	0,0018	0,0069	0,0114
t-1	-0,0291	0,0000	0,0169	-0,0034	0,0167	-0,0149	-0,0119	0,0295	0,0000	0,0000	-0,0952	0,0000	-0,0157	0,0239	0,0182	0,0007
t 0	-0,8960	-0,7864	-0,7500	-0,4983	-0,9508	-0,7505	-0,8667	-0,7393	-0,5019	-0,4981	-0,9000	-0,8006	-0,7936	-0,8050	-0,8000	-0,7559
t+1	0,0000	0,0238	-0,1422	-0,0034	-0,0267	-0,0202	0,0422	-0,0549	-0,0038	0,0102	0,0000	-0,0061	0,0000	0,0177	0,0179	0,0034
t+2	0,0000	-0,1860	-0,0207	0,0101	-0,0068	-0,0041	0,0000	-0,0640	0,0115	-0,0050	-0,0579	-0,0276	-0,0155	-0,0087	-0,0088	-0,0078
t+3	0,0385	0,0000	-0,0053	0,0400	0,0069	-0,0166	0,0000	-0,0248	-0,0075	0,0404	0,0056	-0,0095	0,0000	0,0000	0,0885	0,0157
t+4	-0,0370	0,0000	-0,0053	0,0385	-0,0205	0,0000	-0,0347	-0,0382	0,0038	-0,0049	0,0000	0,0223	-0,0157	-0,0175	0,0000	-0,0174
t+5	0,0096	0,0000	-0,0107	0,0000	0,0070	0,0127	-0,0479	-0,0199	0,0000	-0,0390	-0,0556	0,0249	-0,0160	-0,0179	0,0366	-0,0096
t+6	-0,0095	0,0000	0,0054	-0,0154	-0,0139	-0,0167	-0,0126	0,1419	0,0000	0,0000	0,0000	0,0152	0,0244	0,0364	-0,0118	0,0046
t+7	0,0096	0,0000	-0,0108	-0,0345	0,0000	0,0000	-0,0446	0,0592	-0,0038	-0,0609	0,0000	-0,0180	-0,0159	-0,0395	-0,0040	0,0086
t+8	0,0095	0,0000	-0,0761	0,0065	0,0000	-0,0085	0,0533	0,0279	-0,0038	0,0000	-0,0059	0,0366	-0,0242	0,0046	-0,0040	-0,0081
t+9	-0,0189	0,0000	0,0000	0,0290	0,0000	0,0000	0,0063	-0,0435	0,0076	-0,0216	0,0059	-0,0118	0,0248	-0,0091	-0,0160	0,0012
t+10	0,0000	0,0000	-0,1176	0,0345	0,0000	0,0128	-0,0126	-0,0341	-0,0038	0,0000	-0,0176	-0,0030	0,0081	0,0000	0,0163	-0,0008

Appendix 6. The Calculation Results of Trading Volume Activity

T	LEAD	ASJT	CEKA	LMSH	LION	MIKA	DSNG	DLTA	MERK	TIRA	KONI	ALKA
t-10	0,00174061	0,00000000	0,00006555	0,00005208	0,00000000	0,00148096	0,00016597	0,00000624	0,00000000	0,00000000	0,00000000	0,00000000
t-9	0,00157220	0,00000000	0,00008639	0,00000000	0,00001922	0,00152398	0,00025607	0,00003122	0,00000000	0,00000000	0,00000000	0,00000000
t-8	0,00116910	0,00000000	0,00000168	0,00000000	0,00000000	0,00151030	0,00012794	0,00049959	0,00000000	0,00005102	0,00000000	0,00000000
t-7	0,00140565	0,00000667	0,00001580	0,00000000	0,00000000	0,00194464	0,00022008	0,00000624	0,00000446	0,00000000	0,00000000	0,00000000
t-6	0,00166812	0,00000000	0,00002218	0,00000000	0,00000000	0,00187702	0,00005529	0,00000000	0,00000000	0,00000170	0,00000000	0,00000000
t-5	0,00132664	0,00000000	0,00000000	0,00000000	0,00000000	0,00185853	0,00008713	0,00000000	0,00000000	0,00000000	0,00000000	0,00000000
t-4	0,00082436	0,00000000	0,00002958	0,00005208	0,00000000	0,00184479	0,00024461	0,00002498	0,00093750	0,00000000	0,00000526	0,00000526
t-3	0,00253067	0,00000000	0,00006084	0,00001042	0,00000000	0,00285195	0,00004486	0,00000000	0,00000446	0,00000510	0,00000526	0,00000526
t-2	0,00587359	0,00000100	0,00000101	0,00000000	0,00037488	0,00181688	0,00030726	0,00016861	0,00017857	0,00000000	0,00008421	0,00008421
t-1	0,00320633	0,00001033	0,00005613	0,00000000	0,00000000	0,00201213	0,00027891	0,00005620	0,00000893	0,00013605	0,00001053	0,00001053
t 0	0,00117267	0,00000217	0,00014353	0,00000000	0,00001384	0,00439049	0,00017134	0,00007893	0,00004509	0,00004439	0,00003882	0,00003882
t+1	0,00111431	0,00005333	0,00001765	0,00045521	0,00002903	0,00273271	0,00023449	0,00014363	0,00001920	0,00001718	0,00000526	0,00000526
t+2	0,00101528	0,00000067	0,00001950	0,00000000	0,00000019	0,00317172	0,00018648	0,00004559	0,00001027	0,00000085	0,00000263	0,00000263
t+3	0,00099456	0,00000000	0,00001244	0,00006563	0,00000115	0,00242916	0,00034645	0,00008331	0,00000871	0,00005442	0,00000132	0,00000132
t+4	0,00113906	0,00001017	0,00000269	0,00000000	0,00000096	0,00269872	0,00013182	0,00003060	0,00001853	0,00001599	0,00000000	0,00000000
t+5	0,00081183	0,00000000	0,00000000	0,00029063	0,00000000	0,00355531	0,00010976	0,00003672	0,00001853	0,00001293	0,00000000	0,00000000
t+6	0,00023147	0,00000000	0,00000689	0,00000729	0,00000019	0,00284337	0,00008595	0,00000412	0,00000357	0,00000969	0,00000000	0,00000000
t+7	0,00099246	0,00000000	0,00002319	0,00000417	0,00006056	0,00310307	0,00008213	0,00001761	0,00003058	0,00000051	0,00000000	0,00000000
t+8	0,00089254	0,00000000	0,00001076	0,00000521	0,00000058	0,00272968	0,00006231	0,00000600	0,00002478	0,00001701	0,00000000	0,00000000
t+9	0,00016174	0,00000000	0,00000387	0,00000000	0,00000058	0,00306356	0,00009603	0,00002248	0,00000580	0,00002568	0,00000000	0,00000000
t+10	0,00034788	0,00000000	0,00000000	0,00000000	0,00000000	0,00260601	0,00008830	0,00002248	0,00000179	0,00001888	0,00000000	0,00000000

T	RAJA	HMSP	PSAB	KREN	ERTX	TBMS	PADI	ICBP	BTON	AIMS	MYRX	ITMA
t-10	0,00105536	0,00059002	0,00078981	0,00173996	0,00000000	0,00000000	0,00000004	0,00062590	0,00000556	0,00000000	0,00925817	0,00000000
t-9	0,00061250	0,00013362	0,00081965	0,00149175	0,00000000	0,00000000	0,00000000	0,00042235	0,00006944	0,00000000	0,00872843	0,00008824
t-8	0,00216341	0,00010306	0,00078981	0,00076731	0,00000000	0,00000000	0,00000000	0,00045955	0,00000389	0,00000000	0,00783343	0,00007059
t-7	0,00096824	0,00008883	0,00081965	0,00071502	0,00000000	0,00000000	0,00000000	0,00022041	0,00000000	0,00000000	0,00662848	0,00000000
t-6	0,00044659	0,00008803	0,00014921	0,00089928	0,00000000	0,00000000	0,00000000	0,00045713	0,00000000	0,00000000	0,01009846	0,00000294
t-5	0,00064880	0,00011069	0,00015438	0,00324338	0,00000000	0,00000000	0,00000000	0,00050129	0,00000167	0,00000000	0,00941603	0,00005882
t-4	0,00046573	0,00012786	0,00023199	0,00307821	0,00000000	0,00000000	0,00000007	0,00035538	0,00000000	0,00000000	0,00906746	0,00026765
t-3	0,00038449	0,00010271	0,00069722	0,00073853	0,00000000	0,00016334	0,00000799	0,00018846	0,00029333	0,00000000	0,00480420	0,00041471
t-2	0,00403759	0,00018118	0,00024571	0,00098608	0,00000435	0,00003811	0,00000078	0,00034504	0,00008778	0,00000000	0,00995103	0,00009412
t-1	0,00217734	0,00014073	0,00132859	0,00180281	0,00001803	0,00006533	0,00003085	0,00040210	0,00019278	0,00000000	0,01094650	0,00015294
t 0	0,01376170	0,00014405	0,00067078	0,00315974	0,00003280	0,00008657	0,00218387	0,00034865	0,00003056	0,00000000	0,01575153	0,00017632
t+1	0,01271365	0,00032369	0,00088268	0,00125173	0,00002845	0,00076632	0,00290544	0,00044458	0,00014639	0,00000000	0,00460595	0,00005941
t+2	0,01277666	0,00016360	0,00146054	0,00116177	0,00000008	0,00053710	0,00011502	0,00037521	0,00143375	0,00011273	0,00358019	0,00009456
t+3	0,01717022	0,00010695	0,00099547	0,00072980	0,00000101	0,00014129	0,00002112	0,00057423	0,00056278	0,00001864	0,00697457	0,00053162
t+4	0,00937619	0,00012085	0,00176576	0,00104506	0,00002402	0,00015953	0,00002573	0,00039723	0,00005944	0,00000000	0,00653385	0,00011882
t+5	0,01037092	0,00008508	0,00181056	0,00157001	0,00000000	0,00004301	0,00008087	0,00030010	0,00099431	0,00000000	0,01173942	0,00000912
t+6	0,00145356	0,00014326	0,00334272	0,00076481	0,00000016	0,00001443	0,00000993	0,00027348	0,00614069	0,00000500	0,00939073	0,00003441
t+7	0,00101646	0,00015094	0,00127812	0,00104908	0,00000777	0,00003376	0,00000256	0,00024595	0,00545792	0,00000000	0,00818619	0,00005735
t+8	0,00087781	0,00015074	0,00121582	0,00069003	0,00000163	0,00001034	0,00005420	0,00043242	0,03865958	0,00000000	0,00938885	0,00000279
t+9	0,00126890	0,00004639	0,00150215	0,00047097	0,00000000	0,00001878	0,00005730	0,00038841	0,00061250	0,00001182	0,00935558	0,00000132
t+10	0,00236078	0,00019653	0,00062546	0,00048624	0,00000000	0,00000817	0,00001833	0,00033893	0,00016444	0,00000000	0,00842371	0,00000897

T	IKBI	TOTO	PPRO	IKGI	LPIN	IIKP	SAME	BFIN	INTD	VOKS	BRPT	SMDR
t-10	0,00000033	0,00021831	0,00083558	0,00023360	0,00000000	0,00293774	0,00017331	0,00000050	0,00000000	0,00003971	0,00270100	0,00022350
t-9	0,00000000	0,00028963	0,00022380	0,00009430	0,00000000	0,00884729	0,00021780	0,00000902	0,00000000	0,00003140	0,00529631	0,00027541
t-8	0,00000000	0,00026231	0,00048676	0,00018240	0,00000000	0,00443613	0,00025831	0,00002718	0,00000000	0,00003586	0,00359689	0,00032426
t-7	0,00000000	0,00025203	0,00028902	0,00023950	0,00109176	0,00297241	0,00020890	0,00103713	0,00000000	0,00011069	0,00293645	0,00013557
t-6	0,00000000	0,00018324	0,00050552	0,00022480	0,00000000	0,00747432	0,00017398	0,00019922	0,00000000	0,00006991	0,00187299	0,00016427
t-5	0,00000000	0,00016008	0,00048107	0,00000820	0,00000000	0,00512548	0,00019102	0,00023899	0,00000000	0,00011803	0,00219596	0,00019053
t-4	0,00010392	0,00026812	0,00045632	0,00001760	0,00000000	0,00469378	0,00018297	0,00016146	0,00000000	0,00011406	0,00259352	0,00025098
t-3	0,00009020	0,00047868	0,00150431	0,00001240	0,00000000	0,00483813	0,00019568	0,00020686	0,00000000	0,00015642	0,00178531	0,00025709
t-2	0,00001242	0,00081202	0,00084793	0,00007140	0,00000000	0,00817357	0,00023712	0,00016352	0,00000000	0,00012622	0,00124645	0,00122988
t-1	0,00005327	0,00059583	0,00069636	0,00017700	0,00014118	0,00910446	0,00023237	0,00000257	0,00000000	0,00015293	0,00225691	0,00236755
t 0	0,00000172	0,01504419	0,00351074	0,00078956	0,00000000	0,00473150	0,00018359	0,00126070	0,00002568	0,00009849	0,00295214	0,00237216
t+1	0,00000817	0,00113279	0,00158013	0,00095408	0,00000941	0,00335372	0,00026519	0,00022187	0,00005137	0,00004550	0,00163611	0,00034435
t+2	0,00003072	0,00174292	0,00060223	0,00042912	0,00000941	0,00735991	0,00018415	0,00015363	0,00003717	0,00008858	0,00208576	0,00041522
t+3	0,00004877	0,00172936	0,00060223	0,00023172	0,00000000	0,00719149	0,00032512	0,00111790	0,00000000	0,00001364	0,00319948	0,00071249
t+4	0,00000784	0,00143020	0,00104789	0,00018118	0,00020235	0,00773701	0,00019398	0,00000600	0,00001284	0,00001206	0,00338924	0,00041250
t+5	0,00000425	0,00119616	0,00111643	0,00204422	0,00000471	0,00538290	0,00020312	0,00001755	0,00000422	0,00000255	0,00290999	0,00046652
t+6	0,00005188	0,00141337	0,00102218	0,00032506	0,00222118	0,00681403	0,00019858	0,00011164	0,00000000	0,00002488	0,00138265	0,00021324
t+7	0,00000335	0,00067982	0,00229436	0,00011234	0,00222118	0,00409622	0,00020324	0,00056057	0,00000017	0,00001054	0,00159076	0,00064734
t+8	0,00000057	0,00101881	0,01027662	0,00031048	0,00054306	0,00678707	0,00028539	0,00024101	0,00000000	0,00008947	0,00133864	0,00014335
t+9	0,00001111	0,00119481	0,00525516	0,00024318	0,00000565	0,00922643	0,00024403	0,00012647	0,00000000	0,00000277	0,00223005	0,00032759
t+10	0,00000000	0,00046505	0,00303005	0,00014132	0,00000471	0,00727139	0,00021708	0,00028571	0,00000000	0,00003525	0,00307710	0,00032264

T	ULTJ	BTEK	MEDC	BMRI	INAI	ESSA	BBRI	MKNT	TPIA	PTBA	MEAN
t-10	0,00007184	0,00000147	0,00161518	0,00090245	0,00021843	0,00000445	0,00110201	0,00111490	0,00068674	0,00258930	0,00072275
t-9	0,00009195	0,00000014	0,00399742	0,00052195	0,00019003	0,00000027	0,00094758	0,00121730	0,00067844	0,00177282	0,00088169
t-8	0,00018557	0,00000086	0,00514126	0,00074784	0,00115467	0,00000000	0,00101830	0,00109960	0,00059910	0,00229696	0,00081315
t-7	0,00006142	0,00000017	0,00384855	0,00074966	0,00074842	0,00000055	0,00039804	0,00154130	0,00052362	0,00160217	0,00069112
t-6	0,00000540	0,00000005	0,00402743	0,00057817	0,00001326	0,00003327	0,00099640	0,00119740	0,00058797	0,00056607	0,00075304
t-5	0,00000114	0,00000052	0,00170814	0,00136762	0,00019034	0,00003336	0,00060613	0,00116190	0,00050425	0,00061559	0,00070230
t-4	0,00007007	0,00005760	0,00218590	0,00049290	0,00014362	0,00000509	0,00129596	0,00129900	0,00060330	0,00083407	0,00072594
t-3	0,00010580	0,00000522	0,00291047	0,00100420	0,00035859	0,00001209	0,00064814	0,00138480	0,00055668	0,00092208	0,00066841
t-2	0,00001399	0,00002024	0,00393128	0,00055245	0,00032008	0,00000700	0,00162298	0,00164780	0,00052166	0,00090273	0,00102875
t-1	0,00009092	0,00002327	0,00363120	0,00055716	0,00018182	0,00005600	0,00153193	0,00309450	0,00065741	0,00210296	0,00110330
t 0	0,00001780	0,00015729	0,00588487	0,00024102	0,00014047	0,00014316	0,00082013	0,00097740	0,00047837	0,00147740	0,00182163
t+1	0,00000827	0,00041637	0,00340890	0,00035051	0,00025489	0,00004707	0,00045848	0,00091032	0,00047585	0,00108640	0,00099946
t+2	0,00000267	0,00001957	0,00525163	0,00104521	0,00005619	0,00002763	0,00086140	0,00083368	0,00041817	0,00092400	0,00106187
t+3	0,00000498	0,00128129	0,00388618	0,00033769	0,00009927	0,00002806	0,00064735	0,00094438	0,00042977	0,00687742	0,00133771
t+4	0,00000494	0,00072992	0,00497596	0,00071026	0,00003709	0,00001735	0,00063888	0,00092278	0,00046030	0,00400873	0,00110466
t+5	0,00001084	0,00010431	0,00339231	0,00164836	0,00002541	0,00004022	0,00093401	0,00084040	0,00046197	0,00517497	0,00125705
t+6	0,00000840	0,00002499	0,00919139	0,00095597	0,00040325	0,00016705	0,00075593	0,00086488	0,00058551	0,00224989	0,00116851
t+7	0,00001005	0,00003099	0,01362262	0,00059573	0,00017819	0,00067547	0,00089937	0,00081698	0,00037403	0,00175292	0,00115601
t+8	0,00000722	0,00049085	0,00932533	0,00101824	0,00006771	0,00010829	0,00120903	0,00090792	0,00047259	0,00120763	0,00198005
t+9	0,00037656	0,00023564	0,00558779	0,00131834	0,00006834	0,00022823	0,00040703	0,00090440	0,00036357	0,00146694	0,00102039
t+10	0,00003521	0,00002179	0,01280088	0,00060660	0,00005208	0,00006641	0,00067737	0,00112122	0,00029274	0,00198819	0,00104847

Appendix 7. The Calculation Results of Bid-Ask Spread

T	LEAD	ASJT	CEKA	LMSH	LION	MIKA	DSNG	DLTA	MERK	TIRA	KONI	ALKA
t-10	0,01897533	0,32478632	0,02729045	0,23056300	0,15718157	0,00333890	0,00871840	0,02020202	0,04761905	2,00000000	0,00000000	2,00000000
t-9	0,00738007	0,17142857	0,01897533	0,32673267	0,23529412	0,00250522	0,00694444	0,00610376	0,03536346	2,00000000	2,00000000	2,00000000
t-8	0,01151631	0,03231598	0,01904762	2,00000000	0,15950920	0,00166806	0,01032702	0,12896450	0,04723159	2,00000000	0,00000000	2,00000000
t-7	0,01188119	0,18455744	0,02646503	2,00000000	0,14285714	0,00086319	0,00843882	2,00000000	0,01523735	2,00000000	0,00000000	2,00000000
t-6	0,00383877	0,18867925	0,00382409	0,22222222	0,15568862	0,00175285	0,00505476	0,03796204	0,05538952	2,00000000	0,00000000	2,00000000
t-5	0,00385356	0,17142857	0,13226453	2,00000000	0,20930233	0,00088692	0,00333890	0,03796204	0,05577689	2,00000000	2,00000000	2,00000000
t-4	0,00383877	0,18867925	0,08349901	0,03530633	0,20930233	0,00091033	0,00796813	0,03611218	0,00714493	0,02816901	0,21917808	0,06060606
t-3	0,00757576	0,34482759	0,09861933	0,23350254	0,05405405	0,00177148	0,01438849	0,03085335	0,01141310	0,03533569	2,00000000	0,02962963
t-2	0,00347826	0,07486631	0,11530815	0,11876485	0,07106599	0,00269663	0,05607477	0,05504587	0,14644652	2,00000000	0,03921569	0,08365019
t-1	0,00351494	-2,00000000	0,03773585	0,17090069	2,00000000	0,00089246	0,00716846	0,03636364	0,01021884	2,00000000	2,00000000	0,04477612
t 0	0,00283688	0,13058419	0,01449275	0,22026432	0,04008909	0,00170213	0,00687285	0,00424628	0,01515152	2,00000000	0,13953488	0,13333333
t+1	0,00294551	0,03508772	0,01449275	2,00000000	0,08000000	0,00169635	0,01360544	0,00379507	0,01912046	0,10526316	2,00000000	2,00000000
t+2	0,00303490	0,06228374	0,01438849	0,05128205	0,13069307	0,00168209	0,01388889	0,03174603	0,03759398	0,25000000	2,00000000	0,01857585
t+3	0,00910470	0,15384615	0,01438849	0,10526316	0,06374502	0,00171969	0,01290323	0,03278689	0,02607076	2,00000000	2,00000000	2,00000000
t+4	0,00305344	0,15384615	0,05925926	0,09205021	0,09292929	0,00356506	0,01342282	0,01318681	0,00368324	0,03030303	2,00000000	2,00000000
t+5	0,00301659	0,24637681	0,11320755	0,08201893	0,02105263	0,00180018	0,00711744	0,05714286	0,00368324	2,00000000	2,00000000	2,00000000
t+6	0,02416918	0,22222222	0,09090909	0,11907164	0,07346939	0,00178731	0,00722022	0,00892857	0,00371058	0,05555556	2,00000000	2,00000000
t+7	0,00615385	0,22222222	0,06349206	0,11907164	0,02105263	0,00178094	0,00743494	0,04137931	0,00743494	0,20512821	2,00000000	2,00000000
t+8	0,00317965	0,21561338	0,05363985	0,08695652	0,14675052	0,00180018	0,00772201	0,03846154	0,01492537	2,00000000	2,00000000	2,00000000
t+9	0,01892744	0,33333333	0,09230769	0,06698565	0,08163265	0,00364299	0,03174603	0,01970443	0,01862197	2,00000000	2,00000000	2,00000000
t+10	0,00321027	0,25454545	0,19920319	0,11538462	2,00000000	0,00179051	0,03278689	0,01970443	0,01492537	2,00000000	2,00000000	2,00000000

T	RAJA	HMSP	PSAB	KREN	ERTX	TBMS	PADI	ICBP	BTON	AIMS	MYRX	ITMA
t-10	0,01190476	0,00131492	0,00337268	0,00441501	2,00000000	-2,00000000	0,06741573	0,00868307	0,04975124	2,00000000	0,00651466	0,09664210
t-9	0,00586510	0,00511378	0,00333890	0,00443459	2,00000000	-2,00000000	0,06162465	0,00146951	0,03809524	2,00000000	0,00651466	0,12389381
t-8	0,00576369	0,00152439	0,00337268	0,00443459	2,00000000	-2,00000000	0,06741573	0,00147167	0,05825243	2,00000000	0,00643087	0,07269915
t-7	0,00576369	0,00891379	0,00333890	0,00449438	2,00000000	-2,00000000	0,06741573	0,00442152	0,06489676	2,00000000	0,00647249	0,04963971
t-6	0,00583090	0,00075786	0,00333890	0,00449438	2,00000000	-2,00000000	0,06741573	0,00146092	0,06896552	2,00000000	0,00651466	0,05607477
t-5	0,00589971	0,00301054	0,00333890	0,01324503	2,00000000	-2,00000000	0,06741573	0,00286944	0,04878049	2,00000000	0,00655738	0,06451613
t-4	0,00589971	0,00226387	0,00333890	0,00441501	0,11290323	0,18181818	0,06741573	0,00290276	0,04878049	0,00000000	0,00673401	-2,00000000
t-3	0,00600601	0,00153178	0,00318979	0,00451467	0,11290323	-2,00000000	0,03351955	0,00143988	0,01923077	-2,00000000	0,01315789	-2,00000000
t-2	0,00557103	0,00078401	0,00316957	0,00943396	0,10526316	0,14736842	0,00542005	0,00142349	0,01923077	-2,00000000	0,03300330	-2,00000000
t-1	0,00560224	0,00340984	0,00311042	0,00486618	0,01388889	0,00000000	0,03351955	0,00139762	0,01923077	-2,00000000	0,01290323	-2,00000000
t 0	0,00803213	0,00258065	0,00615385	0,00484262	0,08372093	-2,00000000	0,00766284	0,00278164	0,03921569	2,00000000	0,00593472	2,00000000
t+1	0,00816327	0,00272851	0,00593472	0,00488998	0,01739130	-2,00000000	0,00772201	0,00563380	0,08196721	0,00000000	0,00589971	2,00000000
t+2	0,00829876	0,00267023	0,00560224	0,00488998	0,09090909	0,00527704	0,00823045	0,00290276	0,03305785	0,35294118	0,00593472	2,00000000
t+3	0,00851064	0,00534759	0,00557103	0,00486618	0,08928571	0,06122449	0,00823045	0,00279720	0,00829876	0,02816901	0,00600601	0,02513465
t+4	0,00873362	0,00263505	0,01162791	0,00481928	0,04329004	2,00000000	0,00836820	0,00284495	0,00829876	0,05405405	0,02439024	0,05223881
t+5	0,00921659	0,00529101	0,00586510	0,00477327	0,02597403	0,05780347	0,00881057	0,00569801	0,02371542	0,08219178	0,00623053	0,08823529
t+6	0,00904977	0,00268456	0,00539084	0,00475059	0,08294931	0,01169591	0,01769912	0,00851064	0,02371542	0,02816901	0,00607903	0,00389864
t+7	0,00921659	0,00273598	0,00560224	0,00934579	0,01739130	0,00550964	0,01785714	0,01126761	0,00604230	0,19178082	0,01834862	0,05607477
t+8	0,00938967	0,00820793	0,00569801	0,00468384	0,03539823	0,02298851	0,00896861	0,01139601	0,00647249	0,02985075	0,00623053	0,06427221
t+9	0,00888889	0,00549451	0,00566572	0,00472813	0,09954751	0,05042017	0,02620087	0,00286123	0,00692042	0,22784810	0,01892744	0,04971319
t+10	0,00896861	0,00544959	0,00560224	0,00488998	0,04405286	0,01129944	0,05309735	0,00573066	0,06896552	2,00000000	0,00630915	0,04580153

T	IKBI	TOTO	PPRO	IKGI	LPIN	IIKP	SAME	BFIN	INTD	VOKS	BRPT	SMDR
t-10	0,10248902	0,00407332	0,00396040	0,01318681	2,00000000	0,00400802	0,00719424	0,03208556	2,00000000	0,01136364	0,00332779	0,00851064
t-9	2,00000000	0,00407332	0,00396040	0,01731602	2,00000000	0,04081633	0,00357782	0,07684320	2,00000000	0,20433437	0,00355240	0,00858369
t-8	0,05436338	0,00405680	0,00396040	0,02123142	2,00000000	0,00424628	0,00357782	0,01015228	2,00000000	0,06593407	0,00340716	0,01754386
t-7	0,05436338	0,01221996	0,00396040	0,02114165	2,00000000	0,00426439	0,00714286	0,02518892	2,00000000	0,06128134	0,00336134	0,00865801
t-6	0,05436338	0,00816327	0,00397614	0,01279318	2,00000000	0,02114165	0,00359066	0,04000000	0,30215827	0,02285714	0,00337268	0,00422833
t-5	2,00000000	0,01232033	0,00396040	0,03887689	2,00000000	0,02079002	0,00353982	0,02020202	2,00000000	0,04571429	0,00340716	0,01263158
t-4	0,09329446	0,00407332	0,00394477	0,00435730	2,00000000	0,01652893	0,00706714	0,00975610	2,00000000	0,02538787	0,00333890	0,00840336
t-3	0,00883652	0,00407332	0,00383877	0,01731602	2,00000000	0,01226994	0,00711744	0,01980198	2,00000000	0,01136364	0,00336134	0,01268499
t-2	0,02031930	0,02409639	0,00388350	0,00428266	2,00000000	0,01221996	0,01058201	0,05383848	2,00000000	0,01136364	0,00335008	0,00415800
t-1	0,01183432	0,00402414	0,00391389	0,00417537	2,00000000	0,00836820	0,00704225	0,03045685	2,00000000	0,01117318	0,00337268	0,00410678
t 0	0,07407407	0,00754717	0,00576369	0,00404040	2,00000000	0,00843882	0,00913242	0,01923077	0,06896552	-2,00000000	0,01011804	0,00664452
t+1	0,10526316	0,00716846	0,00583090	0,00412371	2,00000000	0,00836820	0,01754386	0,01904762	2,00000000	0,01566580	0,00337268	0,00682594
t+2	0,04672897	0,00716846	0,00600601	0,00441501	0,26012793	0,00843882	0,00873362	0,05825243	2,00000000	0,01600000	0,00333890	0,00687285
t+3	0,07000000	0,00727273	0,00600601	0,00437637	0,08000000	0,00829876	0,00873362	0,00930233	0,07162534	0,00533333	0,00321027	0,00687285
t+4	0,03045685	0,01492537	0,00623053	0,00428266	0,13333333	0,00823045	0,00888889	0,01941748	0,18181818	0,00536193	0,00309119	0,01388889
t+5	0,11948052	0,00766284	0,00655738	0,00431965	0,46284501	0,00816327	0,00896861	0,04878049	2,00000000	0,00542005	0,00309119	0,01398601
t+6	0,01058201	0,00760456	0,00682594	0,00441501	0,45454545	0,04016064	0,00888889	0,03921569	2,00000000	0,02173913	0,00313972	0,00701754
t+7	0,01591512	0,00772201	0,00738007	0,01336303	0,12389381	0,08301887	0,00904977	0,00956938	2,00000000	0,01086957	0,00325203	0,01408451
t+8	0,06593407	0,00766284	0,00611621	0,00445434	0,04878049	0,00790514	0,00904977	0,00947867	2,00000000	0,02898551	0,00323102	0,00706714
t+9	0,01058201	0,00766284	0,00655738	0,00437637	0,15053763	0,00865801	0,00896861	0,00956938	2,00000000	0,02967359	0,00313972	0,00706714
t+10	0,09571788	0,00784314	0,00655738	0,00877193	0,29280397	0,00851064	0,01801802	0,03809524	2,00000000	0,05825243	0,00303490	0,00706714

T	ULTJ	BTEK	MEDC	BMRI	INAI	ESSA	BBRI	MKNT	TPIA	PTBA	MEAN
t-10	0,01488834	0,03248260	0,00333890	0,00380952	0,00682594	0,05940594	0,00160385	0,00706714	0,00179372	0,00221976	0,24809401
t-9	0,00498753	0,00930233	0,00323102	0,00190658	0,01360544	0,02955665	0,00160643	0,00711744	0,00709220	0,01104972	0,33725197
t-8	0,01005025	0,00934579	0,00322061	0,00190658	0,04620462	0,10256410	0,00160128	0,00356506	0,00438404	0,00218103	0,28272701
t-7	0,00607903	0,01860465	0,00306279	0,00191388	0,02580645	0,08962868	0,00318979	0,00373832	0,00347826	0,00223464	0,32532556
t-6	0,00995025	0,06146572	0,00303490	0,00191388	0,01273885	0,12048193	0,00156863	0,00380952	0,00086693	0,00673401	0,20844511
t-5	0,00995025	0,01877934	0,00307220	0,00192864	0,01273885	0,09699769	0,00156372	0,00772201	0,00175593	0,00228050	0,37279736
t-4	0,00498753	0,00913242	0,00303490	0,00191755	0,01904762	0,07920792	0,00153965	0,00385356	0,00087681	0,00225989	0,07867818
t-3	0,00995025	0,00426439	0,00294551	0,00188501	0,00638978	0,07920792	0,00154440	0,00784314	0,00177148	0,00228571	0,02774383
t-2	0,00498753	0,00397614	0,00295421	0,00378072	0,00638978	0,07407407	0,00151860	0,00392927	0,00088378	0,00227015	0,07282911
t-1	0,00202224	0,03187251	0,00286944	0,00189215	0,00638978	0,00527704	0,00151860	0,00796813	0,01565217	0,00223464	0,09947096
t 0	0,02044990	0,00604230	0,00550964	0,00380952	0,00506329	0,00527704	0,00305344	0,01538462	0,00443459	0,00445434	0,11211886
t+1	0,00414079	0,00576369	0,00579710	0,00382409	0,01010101	0,01591512	0,00306279	0,01562500	0,00435730	0,00439560	0,23222891
t+2	0,00829876	0,00576369	0,00623053	0,00378072	0,01005025	0,00557103	0,00314961	0,00790514	0,00881057	0,00443459	0,16578177
t+3	0,00840336	0,01749271	0,00634921	0,00380952	0,03980100	0,01680672	0,01265823	0,00784314	0,00881057	0,00407332	0,15392063
t+4	0,00840336	0,00600601	0,00664452	0,00379507	0,06549118	0,01117318	0,00311042	0,00796813	0,00447427	0,00407332	0,15734055
t+5	0,00836820	0,00630915	0,00673401	0,00379507	0,01020408	0,05157593	0,00304414	0,01612903	0,00455581	0,00392927	0,21006828
t+6	0,00424628	0,00638978	0,00593472	0,00379507	0,04675325	0,00589971	0,00298954	0,00790514	0,00437637	0,00396040	0,16321786
t+7	0,00424628	0,01980198	0,00557103	0,00379507	0,00539084	0,00589971	0,00304414	0,00809717	0,00457666	0,00397614	0,16106176
t+8	0,00426439	0,00634921	0,00544959	0,00380952	0,02185792	0,00589971	0,00294551	0,00823045	0,00913242	0,00400802	0,19680908
t+9	0,00428266	0,00630915	0,00566572	0,00379507	0,01098901	0,00589971	0,00298063	0,00809717	0,00457666	0,00407332	0,20603435
t+10	0,01273885	0,00638978	0,00589971	0,00379507	0,03260870	0,04129794	0,00298063	0,01587302	0,00457666	0,00400802	0,29514258

Appendix 8. The Normality Test Result

One-Sample Kolmogorov-Smirnov Test

		Return Sebelum	Return Setelah
N		10	10
Normal Parameters[a,b]	Mean	,005000	-,001020
	Std. Deviation	,0065464	,0098105
Most Extreme Differences	Absolute	,220	,155
	Positive	,220	,155
	Negative	-,156	-,109
Test Statistic		,220	,155
Asymp. Sig. (2-tailed)		,186[c]	,200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		TVA Sebelum	TVA Setelah
N		10	10
Normal Parameters[a,b]	Mean	,000809	,001213
	Std. Deviation	,0001501	,0002897
Most Extreme Differences	Absolute	,245	,262
	Positive	,245	,262
	Negative	-,174	-,230
Test Statistic		,245	,262
Asymp. Sig. (2-tailed)		,089[c]	,051[c]

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		Bid Ask Spread Sebelum	Bid Ask Spread Setelah
N		10	10
Normal Parameters[a,b]	Mean	,248478	,272283
	Std. Deviation	,1263277	,0418598
Most Extreme Differences	Absolute	,198	,239
	Positive	,198	,239
	Negative	-,133	-,214
Test Statistic		,198	,239
Asymp. Sig. (2-tailed)		,200[c,d]	,109[c]

a. Test distribution is Normal.

b. Calculated from data.

Appendix 9. The Result of Paired Sample T-Test for Stock Return

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Return Sebelum	,005000	10	,0065464	,0020702
	Return Setelah	-,001020	10	,0098105	,0031024

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Return Sebelum & Return Setelah	10	-,191	,596

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Return Sebelum - Return Setelah	,0060200	,0127943	,0040459	-,0031325	,0151725	1,488	9	,171

Appendix 10. The Result of Paired Sample T-Test for Trading Volume Activity

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TVA Before Stock Split	,00080905	10	,000150081	,000047460
	TVA Before Stock Split	,00121342	10	,000289718	,000091617

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TVA Before Stock Split & TVA Before Stock Split	10	-,437	,207

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	TVA Before Stock Split - TVA Before Stock Split	-,000404373	,000380037	,000120178	-,000676235	-,000132511	-3,365	9	,008

Appendix 11. The Result of Paired Sample T-Test for Bid-Ask Spread

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BAS Before Stock Split	,24847831	10	,126327743	,039948340
	BAS After Stock Split	,27228282	10	,041859815	,013237236

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	BAS Before Stock Split & BAS After Stock Split	10	-,554	,096

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	BAS Before Stock Split - BAS After Stock Split	-,023804509	,153531555	,048550941	-,133634367	,086025349	-,490	9	,636